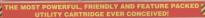


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Editor's

Comment

am pleased to say that in general CDU is received very well by the majority of it's readers. I get letters by the dozen congratulating me on the overall appearance and content of the magazine and disk. It would seem that I have managed to achieve the aims that I set myself when I took over as Editor last September. That is to produce a magazine primarily for the serious computer user which is not only informative and full of technical help, but also contains sufficient programs for every walk of life, enabling enough interest to be generated to keep you buying your favourite magazine. I hope to be able to continue this trend. It is not all sugar and cream though, obviously I cannot hope to please 100 percent of you 100 percent of the time, (as Mr. J.M. Gatt will testify), so if you have a complaint or just want to gripe then let me hear from you. (Not too many now...!!!).

After APRIL's edition, which most of you will be aware was devoted mainly to the new computer users amongst us, this months issue unfortunately comprises of nearly all written word and not a lot of program. I apologise for this here and now. The reason is because as some of you are aware, I have been fairly ill recently and am waiting to enter hospital for the third time this year. Hopefully, by the time this issue comes out I will be back to my normal self and thus so will the magazine. For all of you that have wished me well, I thank you, I hope the rest of you will bear with me for this month. I will have CDU back to it's usual standard commencing with the JULY issue.

Disk Instructions

will be compatible with all versions of the C64 and C128 computers. One point we must make clear is that the use of Fast Loaders', 'Cartridges' or alternative operating systems (Dolphin DOS) may not guarantee that your disk will function properly. If you use one or more of the above and you have difficulties, then I suggest you clear to make some or the computer under normal, standard up and runring should not present you with any difficulties, simply put your disk in the drive and enter the command.

We do our best to make sure that CDU

LOAD"MENU".8.1

Once the disk meru has loaded you will be able to start any of the programs simply by pressing the letter that is to the left of the desired program. It is possible for some programs to after the computer's memory so that you will not be able to LOAD programs from the menu correctly untilyou reset the machine. We therefore suggest that you turn your computer off and then on before loading each program.

How to copy CDU files You are welcome to make as many of

your own copies of CDU programs as you want, as long as you do not pass them on to other people, or worse, sell them for profit. For people who want to make legitimate copies, we have provided a simple machine code file copier. To use it, simply select the item FILE COPIER from the main menu. Instructions are presented on screen.

Disk Failure

If for any reason the disk with your copy of CDU will not work on your system then please carefully re-read the operating instructions in the magazine. If you still experience problems then:

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Please use appropriate packaging, cardboard stiffener at least, when returning disk. Do not send back your magazine-only the disk please.

NOTE: Do not send your disks back to the above if its a program that does not appear to work. Only if the DISK is faulty. Program faults should be sent to the editorial office marked FAO bug-finders.

Thank you.

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B-RAID – Vertical scrolling shoot 'em up. DISKONOMISER – Prudent disk block

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Adventure Probing inundated with usts we start a new

After being inundated with requests we start a new regular feature aimed at the dedicated Adventurists

elcome to Adventure Help. This is a new feature of will be running for a few months to provide you with hints and tips for the completion of some of the adventures that have appeared in CDU in the past. Approximately five issues will be dedicated to each adventure. first of all taking you through the game with the aid of general hints (if you can't see them. I assure you, read the sentences again and they are a map and complete list of the vocabulary and finally a detailed set adventure that will be covered is Kron. written by Tony Rome, which was published in the December 1989 issue of CDU. In this first article I shall cover the first stage of the adventure - the Sea of Storms and how to negotiate it. collecting what is necessary for later

When you have found the boat on the beach you will be able to sail out on to the open sea. Here, though, you face a problem, namely that the go anywhere. However, this is hardly surprising in a small wooden boat when the sails are down! Don't waste too much time here, too long out at sea can lead to death from exposure! Travelling eastwards, and rememberthat you will drown, you will eventually arrive at the foot of a dark cliff. Upon finding the steps up the side of this cliff you can climb them to enter the Boran monastery. The clue for how to find the steps lies in the description of the location. Hang about a minute and the solution may reveal itself! (Sorry, couldn't resist giving a subtle hint!!)

Once inside the monastery you should look around and obtain anything you can. That is the essence of adventuring – keep on examining Helpline



everything in sight and you are bound to find something, even if it is only a scroll last remember when you go back down the cliff you will have to get in your boat again, otherwise it is tybeye, adventurer. Upon leaving Sark there are four possible destinations, excluding the beach, that you should wist. Of course the other out-routing water will only result in you being sucked into somewhere, you don't want to but only result in you being sucked into somewhere, you don't want to but only result in you being sucked into somewhere, you don't want to but only result of your properties.

The four possible outcomes all are result in you arming on dry land in sistend lies in the middle of the sea |not sistend lies in the middle of the sea |not sistend lies in the middle visit in the sistend to the for the fore of the first place you should wist. It will be place you should wist. It will be place you should wist. It will be refit to you to enter the cave – there is something in there that you will a assure you. By the way, the twigs aren't just there to conceal the trancell (You'll have to wait until next month to find out why!)

The second possible destination is to the far west of the Sea of Storms – southwest [ish] of the beach. You are told that there is a ledge a few feet above you which, obviously, you must climb onto. However, how are you going to get up there? Perhaps the

tree could provide some help and what was that you found in the cave? Also, don't forget the tree is old and withered and might break if you are carrying anything heavy. When you and I have given you enough hirst, you will hear the source of the crise that you heard form below. An eagle is trapped, so do the courteous thing and you may get rewarded. I won't say exactly what else you must have, but if you have got to the caves but if you have got to the caves but if you have got to the caves ber that they are dark and you may need some form of light.

The third place you should go is immediately southeast of where you have just been. You hear voices that whisper your name... or is it just the sound of the wind hurrying across the sea" Well have a listen and you may find out what it really is. Should you for any reason discover a clam then think hard about how you are qoing to prise it open.

Now to the last location, the north shore of Sark, north of the great Caves of Goth. The first stage is the tunnel that carries on deep into the caves. Don't forget that it will be dark in there. Until next month. have funl!

Aleatory Music

A new approach to composing music. **Presented by Vic Berry.**

here are two programs on the disk "ALLEATORY MUSIC" and "MACRO EDITOR". Both of these programs are fully compatible with "SID SEGUENCER", published in CDU May/June '89 issue. ALEATORY MUSIC can be used independently. MACRO EDITOR requires music and sound files created by either ALEA-TORY MUSIC or SID SEQUENCER.

defined as music created with an element of indeterminacy. For instance, it is rumoured that Mozart used a dice to determine the musical structure of one of his piano sonatas. Modern composers such as Xenakis and Cage have used more complex systems to provide structures, pitches and durations. Cage used the "I Ching", a sort of oriental tarot, where characters are translated from sticks which are thrown onto the ground. Xenakis uses computers to calculate the movement of individual instruments with equations such as Poisson's law, a formula which is used to model the appearances of rare events such as the decay of radioactive materials. In music. functions or probability tables can be used to determine structures pitches or durations. These functions or probability tables form the raw materials that can be combined, controlled and moulded into any musical structure.

The ALEATORY MUSIC PROGRAM allows the user to set up their own probability tables to define pitch and octave for each point in a music score. The degree to which a final pitch can be predicted depends on the probability tables the user defines. The more unpredictable the expected output from the program the more chaotic or random the music will sound. The more the user limits the choices made by the computer the more regular or ordered the output will be. Order can be imposed until the system creates a monotonous or predictable result. In music a compromise or balance be-

tween the opposing elements of chaos and order produce the best results. By limiting the possible outcome of each note it is possible to create a musical structure from random num-

Imagine the score you will be creating as a grid; three vertical boxes for the three SID chip voices, and as many boxes horizontally as there are notes to be in the final piece. At the beginning all the channels are clear ie. rests. The user selects the number of notes to be stored into the grid. When the COMPOSER is operating, of notes into the score. Each note is then stored individually by first taking two random numbers to select a particular note number and channel. The note number and channel number is then used by the computer to point to another grid identical to the score grid. This grid stores a number which represents the number of the probability table from which the final note is determined. The program user defines which tables are to be used for each voice and note number. The program has a maximum of 16 user defined probability tables which contain the probabilities of a particular octave and note letter name occurring. The computer then uses another two random numbers to determine the octave and note letter name which is finally stored into the score grid. The selected note is stored at the previously calculated note number and channel.

Program Operation

To start ALEATORY MUSIC load and run as a normal basic program. At the start the program loads three machine code flies; the machine commisc sequencer, the note table and the default probability tables. After the flies are loaded the user is presented with the MAIN MENU. Options are selected by moving the cursor to the program of the cursor that the machine the model.

and then pressing the RETURN key. Each option will be dealt with in turn.

Edit Definitions

The screen will show the number of notes in the score for each channel and the percentage (%) chance of a particular channel being selected when notes are stored into the music score. The current filename for the score is also shown which can be changed by pressing the F' key. The note number on the left side of the screen shows which point of the score is also looking at. The numbers

CHAMMEL HELP SEQ. ON OFF EXIT				
	-EDIT=	2	3	
MOTE LIMIT	40	24	6-4	
	0.	0	0	
MOTEM: 1	TAI	ILE HUH	BER	
	- 1	1	1	

under each channel box represent the probability table number which is used at a particular point in the score. The table number is used by the COMPOSER to determine the actual note to be stored into the music.

The channel edit cursor is moved by pressing the 'fl' key. To change the number of notes held in the edit channel hold down the 'CTRL' key and press the 'L' key. Try setting up a short phrase by setting the following limits on the score:

CHANNEL 1 – 32 Notes CHANNEL 2 – 16 Notes CHANNEL 3 – 16 Notes

Note with this particular configuration channel 1 lates twice as long to play through the score compared to channels 2 & 3.7 his creates the effect of having two voices providing a short repeating accompanying phrase with one voice providing some variation. This can be a useful technique to use in your own music.

Pressing the 'O' key will incre-

ment the probability of a particular channel being selected (Pressing SHIFT & 'O' will decrement the channel percentage). The default increment is set at 5%, but this can be changed by pressing the 'P' key. For our test score set up the following percentages:

Note that the percentage chance of channel I being selected is twice that of the other two channels. Because the number of notes in channel. Is twice that of the other channels. The channels that the channels is the channel is to the other channels. It is not notes in each channel is roughly equal. It is not necessary to do this in your own scores, having different densities in each channel can be used to create different effects. However the total percentages for each channel must add up to 100% for the COM-

Now that the basic framework of the score has been set up, each note in each channel must reference a probability table. Pressing the 'N' or 'SHIFT' & 'N' kevs the editor will move through the score. Pressing the '+' or - kevs increases or decreases the probability table number for a particular point of the score in the edit channel. There are a maximum of 16 tables to be accessed. At the start the program sets all channels and points table 1. This will do for the purposes of the demonstration, but extremely complex structures can be set up with the editor. A screen is provided to help the user remember all the func-'f3' key. Pressing the 'f7' key will exit back to the MAIN MENU.

Edit Tables

This screen shows the individual probability tables, by pressing the T1 or T2 keys each table can be accessed. The top part of the table shows the twelve note letter names (marked NTS) and their respective percentage chances of being selected when the table is accessed by the COMPOSER. The note letter name cursor is controlled by the cursor left & right keys. The percentage for each note letter

name is increased or decreased by the "-6" keys. The default increment is 5%, but it can be changed by pressing the "P key. To continue with the example enter the following note letter name percentages into probability table 1:



Notice that as a note letter name percentage is increased the percentage chance of a rest occurring automatically decreases. This is shown in the box marked RTVs: Muscians will know that the note letter names secretal in the above table will make up a ninth chord of C. I chose these values so the example would yield a tonal sound, however any values can be used.

The lower part of the table shows the octaves (marked 8VE) and the percentage chance of occurrence when the table is accessed by the COMPOSER. The octave cursor sleys and the percentages increased or decreased by holding down the SHIFT key and pressing the $+6.2^{\circ}$ keys. For the example set up the following percentages:

OCTAVE 2 - 10% OCTAVE 3 - 25% OCTAVE 4 - 30% OCTAVE 5 - 25% OCTAVE 6 - 10%



Note that the octave percentages must add up to 100% for the COM-POSER to work. In the example the octave percentages show that extreme high and low notes should occur less frequently than middle frequency notes:

In the example (or default setting) score all channels are set to probability table 1, but you can define up to 16 tables if it is required. All functions are detailed on the help screen 13: To exit the editor press 17'.

Run Composer

The COMPOSER is active as soon as this option is selected. The screen shows the note selected through the probability tables and the note it will consider the selected through the consideration between the selected the selected the selected the selected the selected through through the selected through



If you have followed the example to so far you will be ready to store some music, press '15' to turn on the machine code sequencer so you will be able to hear the notes build up as they are stored. Press '11' to start storing notes. Pressing '13' will show the help screen which details all the commands accessed from the composer screen. '7' will exit the composer.

Edit Sound

Once ashort musical phrase has been created you are ready to alter and experiment with the actual sound of each voice. The SID editor is identified to previously published SID SE-OUENCER program. The user sac control over the envelope, waveform, and modulation of all 3 channels. The tempo or speed of the music can also be adjusted from this screen. All the control are detailed in the help screen called up by pressing 13'.

Creating Music from Short Phrases

Musical phrases that bear a close resemblance can help give a piece of music coherence or unity. Musical phrases which are not similar provide variation and contrast in music.

In the above example a short musical phrase can be generated from a simple table. Several phrases can be created and saved onto a disk from one set of probability tables. Combining several music files generated from one set of tables can create subterning several music files generated from one set of tables can create subternion to the score which has already been saved it is possible to related files. By creating a tree of related files files. By creating a tree of related files relationships between short phrases. The relationships between short phrases relationships between short phrases creating your final composition. MCRGO EDITOR can combine these building blocks of music much like a jigsaw puzzle.

A Tree of Related Music Files

If a fixed number of notes are stored into an empty sore a first order file is created this action can be repeated any number of times. Superimposing a further number of notes onto a first order score produces a second order file. This sequence of notes is not only but it related to the residual notes left in the score. If the number of notes stored into the score is small in comparison to the size of the score barrel in the score is small in comparison to the size of the score them the music files. The process of creates a high degree of similarity between the music files. The process of creates the size of the score them the music files. The process of creates a high degree of similarity between the music files. The process of creates a high degree of similarity between the music files. The process of creates a high degree of similarity between the music files.

All the numbers represent a music file.

Ist Order

2nd Order

3rd Order

4th Order

→ 1 → 1.1 → 1.1.1 + 1.1.1 etc...

→ 1.1.2

		→ 1.2.1 → 1.2.2 → 1.2.3	
		→ 1.3.1 → 1.3.2 → 1.3.3 etc	
→2		→ 2.1.1 → 2.1.2 → 2.1.3	
	→ 2.2	→ 2.2.1 → 2.2.2 → 2.2.3 etc	

If there is not sufficient contrast in the phrases from a free of files created by one set of probability tables the user can use several sets to create short musical blocks. On the CDU disk thave given a number of examples of both probability tables and music cores. A tree structure was used in create a tree the number of notes stored for each order was 36. Files were selected and combined using the MACRO EDITOR as follows:

BLOCK A =
(3.1.1)+(3.1.2)+(3.1.3)+(3.3.1*2).
(n=60 notes)
BLOCK B =
(1.1)+(1.3.2)+(1.1.3)+(1.3.2)+(1.3.3
(n=60 notes)
BLOCK C =
(2.1)+(2.2.3)+(2.3.1)+(2.3.2)+(3.3.3
(n=60 notes)
FINAL SCORE = (B*2)+A+C.

Macro editor operation

Load and run MACRO EDITOR as an ommal basis program if the machine code sequencer and note table are not already present in the computer's memory there will be a short pause before the MAIN MENU as shown. The options from the MAIN MENU are selected as before using the cursor and pressing the RETURN key. There are three main options; the editor itself, a hardcopy facility, and the usual disk handling functions.

The editor

The EDITOR is similar in layout as the NOTE EDITOR in the SID SEQUENCER program. The screen shows a page of music (64 notes) belonging to one channel. The highlighted note data in the top left corner of the grid shows the position of the cursor. All the functions available from the EDITOR are shown by calling up the HELP function 'f3'. All functions work on each channel individually, this provides greater flexibility in designing your score. The main functions are; deleting a marked block of music ('CTRL' & 'D'), overwriting a block of music ('CTRL' & W'), and inserting a block of music I'CTRL' & 'I'l. Before calling any of the EDITOR functions you must mark the beginning and end of the block of music you wish to delete or copy (move the cursor to the point you wish to mark and hold down the 'CTRL' key and press 'B' or E1. When overwriting or inserting music mark the block of music and then move the cursor to the point you wish to insert or overwrite before pressing the function.

Block errors will occur if the END block marker is less than the BEGIN-NING marker and you are not allowed to overwrite or insert within the marked block. The remedy to this problem is to copy your block in two stages, however there is a limit of 255 notes stored in each channel.

Hardcopy facility

This option provides a hardcopy of the score in two formats, it is generally useful in helping the user visualize the score during editing. The horizontal format prints each channel in turn, the control of the prints of the control of the prints shows the three channels together. This is useful if you want to find out how the parts interact or which notes are sounding together. Make sure selecting this option or the program will crash.

Disk menu

All the functions are straight forward loading, saving and scratching files. The addition of an APPEND MUSIC allows the user to join files together,



nowever the program does not check how much room there is available for music data so you must be careful. the limit for each channel is 255 notes. In practice the best results are achieved by keeping your music files quite short to give greater flexibility in manipulation by the EDITOR.

Demo files

On the disk there are several music, sound and probability files for you to use and experiment with.



Progression

The probability file was designed from a simple 9 note harmory exercise. The exercise (from Schoenberg's Theory of Harmorny page 172, ex. 18a) was reduced to six chords. The six chords were then programmed as six probability tables. Each note of the chord was given an equal percentage chance of occurring unless

the note was doubled jie a note letter name occurring in two voicesj and then the percentage chance of the note occurring would be doubled. The score was compiled using several saved short phases which were joined asset short phases which were joined saved short phases which were joined in the final score you will notice the number of notes in each channel are different, this makes the individual channels drift out of phase with each other. The phasing is spaced in multiples of 9 notes apart so that the music continues to harmonies proposed to the continues to the music continues to the months of the world of the number of t

ie. CHANNEL 1 – 108 Notes CHANNEL 2 – 72 Notes CHANNEL 3 – 90 Notes

Atonal music

Described above in detail. Each note letter name has an equal chance of occurring in the probability tables. The music lacks harmony or any feeling of tonality.

In C

Here all the notes of the C major scale (All notes without a '#') were given an equal probability of occurring. A related tree structure as described above was used to produce short phrases. Some of the music files were joined together to produce a gradual effect, each voice moving to the next file individually as shown below:

CHANNEL 1: file A – file B – file A – file A – file A – file B – file B

Sigma

The probability tables were calculated using a purely theoretical structure devised from the numbers 5 & 3. The interference pattern created by superimposing these two unit values is:

R(5:3) = 3+2+1+3+1+2+3

Truncating this sequence and superimposing the sequence over the chromatic scale (ie all note letter names)



made it possible to obtain the following musical scale as one possibility:

CD#FF#AA#

These notes were then given different chances of occurring in the probability tables. The points at which certain probability tables would be accessed by the COMPOSER were also decided to an identical structure devised from the numbers 5 & 3. This creates an element of harmonic rhythmic movement. The results from several files were then taken to complete the score

Any method or technique can be used to create music with the program. The process of collecting batches of music files before making a subjective decision about their final use is the technique employed for the demo files. This is just one method from many you can devise for yourself. I think you will agree the results from experimenting with this program are astonishing.

Sprite BASIC

A basic extension that makes sprite maintenance relatively easy by Gordon Moyes

henyouwere buying your '64, you probably looked at the box. Great synthesised sound, sprites and graphics were all promised, but they left one line out Worst Basic of all time. This program gives you control over 32 sprites as well as sound and various other commands.

How It Works

The various commands basically replace a series of pokes. The sprite place is series of pokes. The sprite routines also control a raster interrupt, with a maximum of four zones. Each zone has a separate set of sprite Each zone has a separate set of sprite beginning of zone 0, the 0 zone sprite with the pointers set acide for it in RAM. At the beginning of zone 0, the 0 zone sprite data is loaded into the vic chip. When zone I is reached, zone I sprite data is loaded into the video controller etc.

The restriction is that a zone 0 sprite can only be at the top of the screen, whereas a zone 3 sprite can only be at the bottom. Sprites can, however be tagged together to allow them to cross the various zones, at a cost of the usage of a sprite in the higher numbered zone.

nigner numbered zone.
The raster routine also takes care of the duration of the play command. The duration is decreased at the bottom of every screen raster and when it reaches 0 the sound is determined.

None of the sprite commands will work and the play command will play forever (or until a release command) unless at least one raster zone is activated.

Sprite Commands

SPRXY group, number, xpos, ypos This command positions the relevant sprite at position xpos, ypos. Groups should be between 0 and 3 and numbers should be between 0 and 7. 4 groups *8 sprites = 32 sprites]. Xpos should be between 0 and 511 and ypos between 0 and 255.

SPRAT group, number, priority, expand x, expand y, multi, own colour

This command sets a sprites attributes. Priority should be 0 if you want sprites in front of background text and 1 if not. Expandx and y should be I if the sprites is expanded and a zero otherwise. Multi is 0 if you want a hires sprite and 1 if you want a multicolour sprite. Own colour is a number between 0, and 15

SPRSLOT group, number, slot Set a sprites slot (picture source) number. Slot is a number between 0 and 255. Note that sprite slots 64 to 127 are not usable (the video chip sees character data here), and any slot less than 32 will corrupt screen?

SPRITE group, number, display Display a sprite. Display should be a 1 to turn a sprite on or a 0 to turn it off.

SPRMULT colour1, colour2 Set sprite common colours (for multicolour sprites). Colour 1 corresponds to location 53285 (bit pair 01) and colour 2 to location 53286 (bit par 11).

SPRTAG number, group1, group2, group3

Tag sprites of the same number to gether to allow them to cross a sprite zone. Group should be 0 to untag and 1 to tag to the sprite in the group. I less that the tagged group. Note that group zero sprites are always mean that any command issued for sprite 0,0 would also be followed by 1,0,2,0 and 3,0 so thatit would appear that sprite 0,0 and 3 and sprite 1,0 would also be followed to combine sprite 0.5 with sprite 1,5 command only affects sprite command only affects sprite command sized after spritage.

MAXZN zones

Define the number of sprite zones to use. You must do a maxzn 0 [turn off] before any disk/tape i/o. Zones should be between 0 [off] and 4.

RASTER raster 1, raster 2, raster 3 Change the sprite zone positions. The raster positions must be greater than 50 and less than 240. They must also be in increasing order and at least 10

apart, otherwise flickering of all sprites will result and the normal interrupt (keyboard etc) will run a lot slower. (It wraps around to the top of the screen), and also takes care of the keyboard interrupt and play duration.

Interrupt and play outration.

Note that at least 10 raster lines must be left between the raster position and the minimum y position of that sprite zone. The y position of that sprite zone. The y position of a sprite should not cause the bottom of that sprite to cross a sprite zone, or it may disappear, flicker, reappear in another position completely or be duplicated!

SPRSPR (group, number) = vari-

Is a sprite colliding with another sprite?
This command will make the variable
Oif the sprite is not colliding and a one
if it is. Note that it does not specify
which sprite it is colliding with. The
variable MUST be numeric Inumerical
arrays are ok tool. The collision register for the specified sprite only is
cleared once read [unless the sprite is
still collidinal.

SPRBAK (group, number) = variable

Is a sprite colliding with background information? The format is the same as SPRSPR. Note that background multicolour bit pair 01 is considered transparent for collisions, as well as the background enjoyr.

Sound Commands

VOLUME level

Assign the overall volume level. Level should be between 0 (off) and 15 (loudest).

ENVELOPE voice, attack, sustain, decay, release

Set the adsr envelope for a particular voice. Voice should be between 0 and 2. Attack, decay and release are all times and should be between 0 (fastest) and 15 (slowest). Sustain is a volume level and should also be between 0 and 15.

WAVE voice, waveform, pulse cycle, sfx

Set the waveform, pulse duty cycle and any special effects. Waveform should be 1 = triangle, 2 = sawtooth, 4 = pulse, 8 = noise. You can try mixing them together ladding the values! but it is not recommended.

Pulse cycle is the duty cycle of the pulse waveform (set this to 0 unless you are using the pulse waveform) and should be between 0 and 4095.

PLAYING (voice) = variable
This will make the variable 0 if no sound is being played on that voice, and a one if there is.

49155 = zones 0 RASTER – jsr 49557

49160 = raster1, 49161 = raster2, 49162 = raster3 SPRSPR – jsr 49175; result in 49160

49159 = group, 49158 = number SPRBAK - jsr 49209; result in 49160 49159 = group, 49158 = number VOLUME - jsr 49298 49160 = volume

ENVELOPE – jsr 49313 49158=voice, 49160=attack, 49161 = decay, 49162 = sustain, 49163 =

release WAVE – jsr 49364 49158 = voice, 49160 = wave, 49161 = pulse lsb, 49162 = pulse msb, 49163

= sfx FILTER jsr 49478 49160 = cutoff lsb, 49161 = cutoff

msb, 49162 = resonance, 49163 = type, 49155 = v0, 49156 = v1, 49157 = v2 CLEARSID – jsr 49255

PLAY – jsr 49412 49158 = voice, 49160 = frequency lsb, 49161 = frequency msb, 49162 = duration lsb, 49163 = duration msb RELEASE – jsr 49453

49158 = voice PLAYING – jsr 49243; result in 49160 49158 = voice

If you want to add your own interrupt control to the bottom of screen rater (to smoothly scroll the screen or to swap display pages etc.) you can wettor fithrough locations 50225 and 6. The sequence 'selida #sinth-ndlesta 50225.1da #sinth-ndlesta

If you are going to swap display pages, you will have to change the rasters sprite pointer addresses. You should store the pointer high byte in 49933, 49957, 49981, 50005, 50029, 50035, 50077 and 50101. The pointer high byte is the video base address high byte + 3. I.e. if the screen is at 1024 (normal) then pointer is 1024/2564a = 7.

Other Command

CLS - Clear the screen HOME - Put the cursor at

T(x, y) - Put the cursor at (y,)

If (x, y) - Put the cursor at x, y

IRDR colour - Change the border col

COLOUR colour - Change the text [ink] c

TEXT mode - 0 = hires, 1 = multicolour
CMULT col1, col2 - Set text multicolour registers
CSET set number - Character set (2=upper, 3 lor

OV (port) = variable

Reset the compute

Variable will be 1 = up, 2 = down, 4 = left, 8 = right or possibly a combination.

BTN (port) = variable Variable will be a 21 if the fire but

Sfx should be 0 = normal, 1 = synchronise, 2 = ring modulate, 3 = ring mod

and sync and 4 is disable oscillator. FILTER cutoff, resonance, type, v0,

v1, v2
Set filter variables. Cutoff is a cutoff frequency between 0 and 2047.
Resonance is between 0 and 25. Filter type is 0 = no filter, 1 = lowpass, 2 = bandpass, 4 = highpass, 5 = notor reject. V0, v1 and v2 should be 0 if you do not want the corresponding voice to be filtered and a 1 if you do.

CLEARSID

This command clears all of the sid registers to 0, turning all sound off. It has no parameters.

PLAY voice, frequency, duration Make a sound or noise. The frequency is a value between 0 and 65353 and notes can be found in the user manual on page 152. If you multiply the the low frequency, you end up with the final frequency. The duration is a number between 0 and 65351. If it is 0, the note will play until a release statement is sused. The duration is in 1/50ths of a second. Le. PLAY 0, 9770. 50 would play an octave 5 not held up while the duration is not be duration in 1/50ths of a second. Le. PLAY 0.

RELEASE voice

This command will stop sound that is being played. It can be used to halt a sound prematurely or to terminate a sound created with a play duration of 0.

Using Sprite Basic

I would recommend that you use cset 1 at 2048-4095 (set 1 on the 3 in 1 editor by Tony Crowther – published in Your Commodore) if you are using user definable characters, leaving sprite slots 128 to 255 free for sprites.

If you want to move the start of basic up to 16348 (to protect it from graphics data) you type poke 44,64: poke 16384.0:new.

Machine Language

All of the sprite ad sound commands can be used directly from machine language JSR calls, without requiring the basic section of the code. The calls are:

SPRXY – jsr 49746 49159 = group, 49148 = number, 49155 = xpos lsb, 49156 = xpos msb, 49157 = ypos SPRAT – jsr 49659

49159 = group, 49158 = number, 49160 = priority, 49155 = xexp, 49157 = yexp, 49161 = multi, 49162 = own colour

SPRSLOT – jsr 49799 49159 = group, 49158 = number, 49160 = slot SPRITE – jsr 49725 49159 = group, 49158 = number, 49160 = display SPRMULT – jsr 49576 49160 = colour 1, 49161 = colour 2

49160 = colour 1, 49161 = colour 2 5PRTAG – jsr 49589 49158 = number, 49160 = grp1, 49161 = grp2, 49162 = grp3 MAXZN – jsr 49814

From Here

This utility should greatly enhance your machine language programming and add new life to basic. Get writing and try it out!

Adventure Writing

Another new series gets under way in the shape of exploring the theories behind adventure writing

By Jason Finch

number of software package have been written in the past, for both tape and disk, to assist with the writing and development of adventure games. For example, the Graphic Adventure Creator and the Oulli to name just two. Each one has its own particular characteristics that make it unique and they undoubtedly simplify the procsos of writing such a game. However, It is my opinion that the satisfaction obtained by writing your own adventure and also programming it yourself, ignoring the comparisons bethat obtained by planning one and then loading up another program whereby you simply enter the text and roughly what should happen. And with certain packages that help to credit the software company that originally published the program. Or credit the software company that originally published the program. Or credit the software company that originally published the program. Or grammer a great deal of statisfaction grammer a great deal of statisfaction to the programmer of great deal of statisfaction to the programmer of great deal of statisfaction to the programmer of great deal of statisfaction who have been considered to the programmer of the programmer of great deal of statisfaction that is not considered to the programmer of the programmer of great deal of statisfaction that the programmer of the programmer of great deal of statisfaction that the programmer of the

language.

This series of articles will not only familiarise you with the main aspects of adventure games, it will also carefully look at and consider all attributes that could be taken. In a later issue I shall introduce you to a short and quite simple example adventure that I have written, with graphics - a subject that will come under the spotlight next issue. This will be built up issue by issue until you finally have a complete working graphical adventure. Of course, you will know how to full explanations of each months piece. that will link everything together and save it onto your own disk

However, in this, the first of the new series, I shall delve into possibly the most important part of an adventure – the text. First, though, etc. make a couple of things clear. The type of adventure covered by this series is one where the player types in commands which are then executed and the outcomes displayed on the screen. There may well be other characters involved but lam not going to talk about arcade adventures or

to talk about arcade adventures or role-playing games. Without doubt, every adventure text, whether it be regarding the vast amounts used to describe the locations or whether it be the 'vocabulary' of the computer. The latter cannot really be condensed in any way but the former, the room descriptions, can. So, this month I am going to explain quite an important, although ing an adventure. Most location descriptions will consist of, usually, lower case letters with the odd capital here and there, like most pages of this magazine. If you are able to somehow compress the text easily, and recall it with the same ease, then it may be profitable to do just that. On the disk you will find a program, written in BASIC, called "AW-COM-PRESS". Eventually I shall convert the 'decompression' part to machine code for speed but I have left it in BASIC so you can see what is happening.

```
Enter the text that you want to compress Use the standard cursor keys and the left arrow to mark the end of the DEL cannot be used but press RETURN to begin compression on the said of the party.

Becompression of text complete.

Compression of text complete.

Griginal length... 256
Compressed length... 256
Compressed length... 258
Coded into stored 49132 to 49323 incl.

Decompressed text:
now is the time for all good men to come to the aid of the party.

analysis and the time for all good men to come to the aid of the party.

Assessment of the time for all good men to come to the aid of the party.

Assessment of the time for all good men to come to the aid of the party.

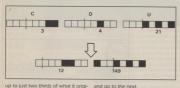
Assessment of the time for all good men to come to the aid of the party.

Assessment of the time for all good men to come to the aid of the party.

Assessment of the time for all good men to come to the aid of the party.
```

The method is only one of many

A value is assigned that instructs the and has the ability to compress text to computer to leave that pair of bytes



nally was, although the average sentence will compress to about three quarters of its usual length. The secret lies in taking each set of three characters in turn. Each letter is considered separately and then converted to a number between zero and thirty-one. The letters A to Z are represented by the numbers one to twenty-six inclusive, the space by zero and then the most common punctuation marks, such as the full stop, comma, question and exclamation marks are converted to twenty-seven onwards. This means that each usual eight bit is condensed to just five bits. Three five bit numbers, when stringed together, form one fifteen bit number or near enough two eight bit numbers with one bit spare. Therefore, the usual three numbers that represented the characters have been coded and become two numbers. Of course, if you require a capital, or some other character then set that spare bit to a one and make the second number in the pair the actual POKE, or more commonly the ASCII code for that character. In case you didn't understand all that I have represented it in the figure, you will see the original three bytes - the letters C, D and U. The boxes beneath each represent the binary form of the POKE code. Shaded boxes represent a one. The necessary bits are chopped off below. You see the far left hand bit is clear. If that left hand byte is made the value 255 then the computer can be forced to read the second number as the actual ASCII or POKE code as I mentioned before. But what happens when the second or third byte of a

and go to the next.

Have a look at the program on the disk and see exactly how it works. The concept is quite hard to explain although the theory is very easy. You will also need a decompression routine to decode the numbers into leaible text. This is just one method, there are a few others. For example common words such as 'the', 'and', 'you' and so on could be given snecific coded numbers that instruct the computer to print that word when the number is read. This would not have the same compression power but is another alternative. As I say, have a play about with the BASIC routine - it has got plenty of REM comments to take you through it step by step.

Screen display

You may relate the idea of having an excellent screen display to fast action arcade games but it is just as essential, if not more so, with an adventure. A person is likely to be sat at the keyboard for some while playing your adventure and so the screen display does not want to be dull and boring. Aspects such as colour and graphics can be brought in and further on I shall discuss the implementation of both. However, first you need to decide how your main screen will be split up or formed.

The first question you should ask yourself is; "Will my adventure have any pictures and if so, how much importance am I going to put on them?" If you decide to have an all text adventure then you will need to put as much thought into the screen display as you will if you are having a mixture of text and graphics, and if you decide to have pictures will they be visible all the time or optionally visible with the press of a key and what size will they be - whole screen pictures, about half a screen or perhaps you only want them to be very small so how about using eight multicolour sprites? Some people believe that an adventure should be all text because the player can then conjure up in his own mind what the location should look like, whilst other people think that a screen full of text looks "boring". So how do you decide? In my opinion you should compromise and have it half text and half graphics with the option of having the graphics turned off if you don't want them. First let's consider a possible screen

You could have a division about three quarters of the way down the screen with the top part being the "adventure window" where all the location descriptions and the messages are displayed, with the bottom few lines being the "input window", devoted to the inputting of the commands. The best approach, though, would be to have an integrated display where it is all one. The location is described with the prompt to type a command immediately below it. When you enter the command the whole display shifts up and the result of your action is shown and so on. In your adventure you will want to display the exits that are available from one location. You could either merge these into the text, for example - To the east a long pathway stretches over the hill, or you may want to have a separate line are available - You can go north, east and southwest. The same sort of decision needs to be made about how you describe the objects that are

visible in that location. On the other hand, if you decide to have bitmapped graphics pictures you must decide how you are going to go about displaying them. Will they be full screen pictures loaded from disk as required or will they be drawn with a set of line, circle and box commands? The latter occupies less memory but it is not as easy to difficult to program. If you have knowledge of machine code then you could write a routine to introduce raster splits". This will allow you to have the top section of the screen displaying graphics whilst the bottom

is the text window. If you decide on going to be? I mentioned earlier the possibility of using multicolour sprites. This will give you a very small picture that can be displayed constantly but with this technique is very poor and should only be used if the picture is meant to be a simple stimulus.

Now I have provided you with a few ideas as to the layout of the screen. Forget the pictures for a while and let's concentrate on the text. At the start I commented on the fact that you are likely to have the majority of the text in lower case letters - most people prefer this. Don't fall into the trap of having everything displayed in upper case. Try to imagine what this magazine would look like if every article was written in upper case letters. The next most important thing is the use of colours. It helps a lot in arrade games to have variety but

does it in adventures? There are sixteen different colours at your disposal although you should never use more than about three. Don't dazzle the player with a huge array of colours throughout the text. more interested in. However, always ensure that the colour is visible without background. Likewise don't make the for any length of time looking at bright white text on a black background. Although it makes it visible, tone it down a bit to light green, cyan or something of that nature but keep it coloured, not grey. If you feel that you need to change the colours then keep all the descriptions and messages in one colour and possibly vary the colour in which the commands are typed or messages related to actions are graphics, if you decide to include them and in whatever forsm they take, should be as colourful as the

That wraps up the theory for this month. In the next issue I shall say a bit about storage of information and actually programming part of the



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The Astrodus Affair

Can you survive the perils of the spaceship Astrodus and repair it to the full before flying off to a new life.

By Mark Turner

is 2 120. Survival amidst the new Corporate Worlds System is becoming increasingly difficult, so when news reaches you that a technician is required aboard a nearby trading cutsory check from Captain Gontra, you're soon on your way to Custom Moon Sallbus aboard the spacecraft Astrodus, enjoying your first regular job for over a year, and not even giving a second throught to the squalor you for being alley.

For almost three weeks everything is great: eating, working, sleepcontinual abuse from that smarmy junior officer Stelen, although given half the chance you'll soon make him pay for his jocular comments). Then, true to the usual course of your life. your luck, and that of the crew's with it takes a sudden nose-dive straight into an uncomprising abyss. Scavenger ships descend from nowhere onto the Astrodus, rocking the craft with straffing flak and panicking various crew members. Common sense tells you that every trading-craft must be seconds the Astrodus' defence systems are operational, easily shielding the craft against the onslaught, whilst Gontra calmly informs everyone that "no diseased Scavengers are getting hold of this cargo, you mark my words". Hence no-one is more surprised than the captain himself when, contrary to the predicted course of events, the Scavengers suddenly bring forth their secret weapon, a militarystandard Damage Laser. Within seconds the Astrodus' defences are breached; a hole the size of small cargo-bay is opened in the outer surface, allowing the Scavengers swift.

and immediate boarding access. They

quickly began to sour the craft. Igying waste to anything of no valued not every turn, and you suddenly reals every that there's to be no escape this little. For you've trapped inside an enclosed vessel with nowhere to run, and wery little places to hide. A sudden blow to little places to hide. A sudden blow to little places to hide. A sudden blow to the back of the head provides a solution to your dilemma, asy you crumple to the floor, consciousness allered floating away beyond reach towards a ripolling multicoloured horotox a ripoling multicoloured horotox.

On regaining consciousness you find yourself staring through unfocussed eyes at the ceiling of the Bridge.

infocom, although whether it manages to attain such standards is your own opinion! [Probably not Infocoms]] On stating the game your eimmediate thoughts will undoubtedly be concerned with simple survival, which will certainly be a bit tougher than the above commentary indicate. However, your eventual aim is to repeal and regain full working control survives with the crift as your own. Survives with the crift as your own.

You're at the Bridge of the Astrodus, or what remains of it, Denris and ryined machinery betray an usly battle, tartain Gontra being one of the many easilities. Books lead south and east. A grawer is set into one console.

the Scavengers have simply left you to die in a pool of darkly-coloured good. leaving you with only a large gash to the head and a splitting headache. At first, sitting-up sends the room spinning, but you rapidly recover your sense of balance, and eventually manage to stand on your own two feet. A cautious examination of the craft reveals a great deal of damage, and enough signs of violence to make your stomach heave, but you soon realise that everyone else has either been killed or taken, with most of the cargo having been stolen or destroyed. As you slowly pull yourself together, the reality of the situation eventually dawns on vou. You're alone, a trained technician aboard a damaged but repairable craft. The Astrodus is the key to a way of life you've always dreamed of, fantasies, and it's all simply waiting there, asking for the taking

the Astrodus Affair is a foray into the original world of adventure gaming, as created by the likes of such legends as Scott Adams and Der Astrone Arfair
(Inc Ser Cation)

By Hark E. Turner

(The Ser Cation)

Commonwealth (See AP) Pr. Luner

(Cathol Total (See AP) Pr. Luner

(Cathol T

DROP, INV, ENTER, TEXT, GRAPHICS, etc. also available, as are many more (but no HELP command, just to be

Since you could have been unconscious for day, don't be too surprised if some of the cargoes have begun to roam around the craftly and general, don't forget to examine EVERYTHING you come across, there are very few red herrings lying around, everything is logical (despite first appearances), and there are no major random elements in the game what so-ever. As a final hint, there are at least five things to be repairing to

The Astrodus Affair was originally written in 1987 using the Graphic Adventure Creator, and then vastly changed and rewritten specially for Commodore Disk User in June 1989.

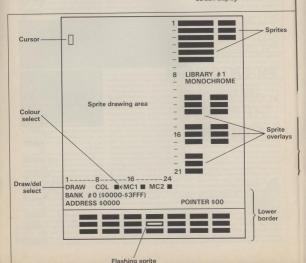
Sprite Generator 2

Yet another sprite creator joins the arsenal of graphics aids for the serious programmer

By Brian Graham

prite Generator is a utility for designing sprites for use in games, etc. It allows you to make monochrome or multicolour sprites, overlay sprites, animate them, store them anywhere in memory, save them and many other things.

Screen display



Using the program

Once the program has loaded you will see aflishing cursor in the top left hand corner of the sprite drawing from the program of the program o

Changing the colours

To select a different colour for the sprite just press F7. Other colours can be selected as shown below.

COLOUR OPTIONS	KEY
Background Border	F5 B
Sprite Colour	F7
Sprite Multicolour 1	

The Sprite Colour is shown beside the letters 'COL' whilst Multicolours 1 & 2 are shown beside the letters 'MC1' & 'MC2' respectively, all of which are under the drawing area.

Colour modes

Sprites are capable of being drawn in one of two modes: Monachrome or Multicolour. Each mode has its own advantages and disadvantages. For advantages and disadvantages, For mode, there is a higher resolution but you can only draw in a single colour finot necessarily black or writtel. This colour is selected by the Sprite Colour (F7), in the Multicolour mode you can only drow in a single colour field of the sprite Colour (F7). The Multicolour mode you can only dwith the Sprite Colour (F7) and the two Multicolours), 6. respectively) but with a loss of half of the resolution. Having selected the two multicoloured mode press M. This togales between mode press M. This togales between

the two modes. When in multicolour mode pressing N will select which of the three colours is to be plotted. The active colour is indicated by an arrow pointing towards a coloured box

Library sprites

and altered. These sprites can be and use joystick or cursor keys and the fire button or RETURN to finish). Each sprite can have an independent expansion (more about these later). They can also be combined to create one larger 'pseudo-sprite'. The five sprites can be selected by pressing the appropriate number, eg. press 3 to select sprite number three. The current sprite under construction is shown on the sprite drawing area and also in the top right hand corner two sprites, one of which is permanently expanded in the X and Y direcsion). The current library sprite's number is shown above its colour mode near the top right of the screen.

Sprite manipulation

The current sprite can be manipulated in various ways, for example, scrolling in all directions, mirroring and exclusive-oring (ie. toggling the set and unset bits) in Mono' mode only. The controls for these are as follows:

MANIPULATION	OPTIONS KEY
Scrolling up	U
Scrolling down	D
Scrolling left	L
Scrolling right	R
X mirroring	X
Y mirroring	Y
XORing	E
Clearing the	
drawingarea	Shift & CLR/HOME

Sprite interrogator

The Sprite Interrogator (or Sprint) is to give the user a complete view of all the sprites in memory. When loading the program all the sprites are merely random memory and appear as a bit of a mess. However once a sprite has been created it can be stored anywhere (almost) in memory.

ing O. The current bank is shown is the range of memory locations that that bank contains (in hexadecimal are seven sprite frames, the middle one of which is flashing. To change their colours press ':' and to toggle their colour mode press ". These frames show the sprites that are at a section of memory at any given time. ing the flashing one in memory while the one to the right is the one immediately after the flashing one. All the other frames precede or come after sequentially. To advance the address and thus examine the next sprite in memory press '+' and to lower the flashing sprite is indicated underneath the bank indicator and its pointer is hex notation). For more information

If you want to animate, save or are sprites you must place them in a

Storing the Sprite

To store the current sprite at the location of the flashing sprite press S. To take the flashing frame to the drawing area press G. To whipe the flashing sprite press W. To trade the current The best place to store sprites is in Bank 1 \$4000-\$7FFF) because it has mothing violatile in it, generally. This will allow 256 sprites to be stored here. R is suggested that novices always use this bank NB. NEVER store always use this bank NB. NEVER store you will cash the program.

Continued on page 44



INTERFACING

We continue our excursion into the world of the 65xx family of microprocessors

By Steven Carrie

Now we will go on to look at some other facilities provided by the CIA. Let's pick up again with a look at the two interval times; TIMERA and TIMER. B. Their operational modes are controlled by two Control Registers. CEA for TIMERA (registers SOE) and CRB for TIMERA (registers SOE), since each timer has 1 to list, they each require two registers; SOE and SOS for TIMER A. 506 and 507 for TIMER A. 506 and 507 for TIMER B.

The C64/128 operating system uses one of the timers from CA1 to cause the system interrupt that scans the keyboard. The timer runs in continuous mode and causes an IRO signal about every 1/60th of a second. You can alter this by writing a new value to the TIMER A registers at SCO5, but doing so may have a strange effect on your computers response to keypresses and the curresponse to keypresses and the currespon

sor flash rate.

The timers work by counting down from a predefined value (Seedined (Se

The timer's count start value is set by storing the 16-bit value to the appropriate registers. This value will be controlled. Both timers may also be programmed to count pulses applied to certain port input pins. Timer B may also count Timer A underflow events, thereby allowing the timers to be used as one 32-bit timer/

counter.
The two control registers CRA and CRB are used to define how the timers will operate. CRA controls TIMER A whilst CRB controls TIMER B. They also control the operation of the Serial Port system but we will leave this

The layout of the two Control registers is shown below.

Control Register A

bit > 7 6 5 4 3 2 1 0

be stored until it is overwritten or the power is removed. Whenever a timer is started, this value is loaded and the countdown begins, if the timer registers are read, the current value of the timer is returned.

Each timer may be used to produce an output on a particular port bit. The nature of this output may also art Set this bit to 1 to start TIMER A or 0 to stop it. When in oneshot mode (see run mode) this bit is automatically set to 0 when underflow occurs.

bbon By setting this bit to 1 you can cause TIMER A output to appear on pin PB6. When this happens, the line is forced to an output regardless of the data direction register bit. You can control the type of output on PBG using his bit. Output or occurs when an underflow event occurs. Whis bit is 0, the output will PULSE for one cycle. If it is 1, the output will TOGGE; i.e. change logic level. This level will intribility be 1 when TIME

A starts.

This sets the runmode. When
0, TIMER A will operate in
one-shot mode; i.e. it will run
for one countdown and then
stop. When the bits 1. TIMER

spm This bit sets the Serial Port mode for input (bit=0) or output (bit=1). We will look at the serial system later.

Because the 64 is sold all over the world and some countries use mains supplies of differing frequencies, the Time of Day clock is able to operate at different speeds. This bit sets the TOD source clock to either 50Hz (bit=1) or 60Hz (bit=0). In this country, we set this bit to 1. We will look at the tod clock every second to change (increment actually) the screen border colour. Not very exciting stuff, but it does show you one way to use the timers.

Program 7. Simple CIA Timer interrupt

of he 10 , SIMPLE CIA TIMER INTERRUI to 20 ; 30 ORG \$C800 cc 40 ; 11 50 CIA EGA \$DD00 ; 1-60 ; We 70 JMP START

Control Register B

bit→ 7 6 5 4 3 2 1 0
alarm inm1 inm2 load run out pbon star

Bits 0-4 are the same to those in CRA except that they control TIMER B rather than TIMER A and TIMER B out-

inm1/2 TIMER B may use one of four possible inputs. These are as

linm linm

0 0 TIMER B counts system clock pulses.

0 1 TIMER B counts positive CNT pulses.
1 0 TIMER B counts TIMER A underflo

events.

 TIMER B counts TIMER A underflow events only when CNT is held high.

m When this bit is zero, writing to the TO registers sets the TOD clock whereas

registers sets the alarm.

A will operate in continuous mode.

bit. When you do, TIMER A is redoaded within's preservalue regardless of it's current state.

If this bit is zero, TIMER A will count clock pulses. When set to 1 the timer will count (positive) pulses applied to the CNT pin. Thus you may use TIMER A as a timer lay-

Neither TIMER A or TIMER B of CIA 2 are used by the system so they are available for our use. It's probably best to leave CIA 1 alone except perhaps to turn off the system IRO timer. Since Port B appears at the user port, you have both PB6 and PB7 lines and the CNT lines from both CIA's.

Program 7 shows a simple timerbased, interrupt driven program which links timer's A and B together to produce an interrupt approx once

it=1)	50	.CIA EQA \$DD00
oun-	60	
. We	70	JMP START
clock	80	JMP STOP
	90	
-	100	.START SEI
200		LDA # <intr< th=""></intr<>
200		LDX #>INTR
		STA \$0318
1000	140	STX \$0319
tort	150	
tart		LDX #>1000
888		STA CIA+4
		STA CIA+6
888	190	
999		STX CIA+7
100		LDAO #\$0
		LDX #\$41
	230	STA CIA+14
	240	
-		LDA #\$82
100		STA CIA+13
-	270	
200	280	RTS
-	290	
-		.STOP
ow	310	
		LDA #\$1F
		STA CIA+13
	340	LDA #\$47

550 ; READY.

Program 7 Operation

You can start this routine by typing SYS 51200. Eve put it here so as not to interfere with the Parallel Printer Driver if you have it in memory. You can always relocate it if you wish.

always relocate it if you wish.

Both timers are set to a pre-scaled value of 1000. Since TIMER B will be counting TIMER A underflow events and TIMER A counts system clock pulses (1 million per second), the resultant delay should be around 1 second.

CRA is set to \$01 (start TIMER A) and CRB is set to \$41 (start TIMER B and set it to count TIMER A underflow events). In order to enable the TIMER B interrupt, we write \$82 to the ICR.

When TIMER B reaches zero, the NMI interrupt service routine takes control. As before, we check that the interrupt has been caused by our timers. Once we have incremented location SD020 (the VIC II border colour register) we return via the exit interrupt routine at SFEBC. Use either RUNSTOP/RESTORE or SYS 51203 to, stop it.

Time of Day Clock

The TOD Clock is split over 4 consecutive registers starting at base \$+\$04. The registers all read out in BCD format which simplifies their use. The organisation is as follows:

base+\$04 Tenths of seconds base+\$05 Seconds base+\$06 Minutes base+\$07 Hours

For the clock to count accurately in this country, you must set the tod bit in Control Register A (CRA) to one. This sets the clock rate for 50Hz which is the mains frequency in this country. Bit 7 of the Hours register is the AMV PM indicator (1=PM) and may thus be tested easily with the BT instruction.

tested easily with the Bil insuction. The following procedure should be adhered to when setting or reading the clock. When setting the clock, TOD is automatically stopped when a write to the hours register takes place and will restart again after a write to the tenths register. So, if you write to

hours-minutes-seconds-tenths (in that order) then the clock will always start

When reading the clock, you should read in the same order. Although the timer keeps counting during the read operation, the values are temporarily latched when the hours register is read.

The alarm may be set by first setting the alarm bit of Control Register B (CRB) to 1, then writing the alarm values to the TOD registers. Remember to reset the bit to 0 after-

words. Program 8 uses the TOD clock in CNA 2 to display a clock on the screen. It starts at 13:00:00 and the alarm is set to 13:00:01. The program simply loops around displaying the clock values. When the alarm occur joka an NMI interrupt he program will stop. You could, for example: use the system 17:60h second interrupt to 6the display work thus allowing the machine to get on with some other machine to get on with some other.

Notice here that I have not set the TOD frequency bit (CRA-bit 7) as I described earlier. For this demonstration it doesn't matter too much but you should make sure you set it correctly when measuring longer periods of time.

ds (or time.
	;TIME OF DAY CLOCK EXAMPLE
	ORG \$C400

O ;
O CIA EQA \$DDOO
O START JSR INIT
O JSR DISPLAY
O JSR STOP
O RTS

110 ; 120 :INIT SEI 130 LDX #<INTR 140 LDY #>INTR 150 STX \$0318 160 STY \$0319

180 STX CIA+15 190 LDX #3 200 SLO LDA INITCLOCK

230 BPL SLO 240 LDX #\$80 250 STX CIA+15

260 LDX #3 270 .SLI LDA INITALARM,X t 280 STA CIA+8.X t 290 DEX J 30 BPL SLI J 310 LDA #584 - 320 STA CIA+13 J 330 LDA #0 S 340 STA ALARM E 350 CLI

initclock byt 0.0.0,\$81

400 :
410 : STOP SEI
420 : LDA #51F
430 : STA CAN-13
440 : LDA #547
450 : STA 50318
460 : LDA #5FE
470 : STA #0319
480 : CLI
490 : RTS
500 :
510 : ALARM BYT 0
570

10 ALARM BYT 0
20 :
30 :INTR PHA
40 TXA
50 PHA
60 TYA
70 PHA
80 LDA CIA+13

500 BNE 3 510 JMP \$FE4C 520 LDA #\$80 530 STA ALARM

CLOCKDATA RYT 0 0 0.0

| CLUCKLANA | CLUC

840 LDA #'A' 850 BIT CLOCKDATA+ 860 BPL 2 870 LDA #'P' 880 JSR \$FFD2

900	BPL DL1
910	RTS
920	
930	.DATAOUT PHA
940	LSRA
950	LSRA
960	LSRA
970	LSRA
980	ORA #\$30
990	JSR \$FFD2
1000	PLA
	AND #SOF
	ORA #\$30
1030	JSR \$FFD2
1040	LDA #11
	JMP \$FFD2

Program 8 Operation

The program will initialise the CIA registers and will then run in a loop which reads the TOD registers and displays the result on the screen. This loop will operate until the flag byte ALARM is set to \$80 by the NMI interrupt service routine which will take control when the TOD alarm operates.

The byte strings INITCLOCK and INITALARM set the initial TOD conditions. They are "back-to-front"; i.e. 10th second byte first. Remember that the 7th bit of the hours register is the AM/PM flag. Here both the time and alarm hours byte have bit 7 set to

As described above, each register reads out in BCD format so all we have to do with each byte in order to display it's value is to logically OR each rybble with \$30 next hus turning it into an ASCII character. We read the clock registers into the CLOCKDATA byte string then the routine DATAOUT performs the conversion operation on the byte passed to it in the accumulator.

When the alarm interrupt occurs, the ALARM byte is set to \$80. When this happens, control will pass from the DISPLAY subroutine and back to BASIC via the \$TOP subroutine which will disable the CIA.

The Serial Port

This is a buffered, 8-bit register system. The serial control bit in CRA selects input or output mode. I should point out that this isn't an RS232/432 etc

serial format. If you want this then you should use the kernal's RS232

In input mode, data applied to the SP pin is shifted into the shift register on the positive edge of the signal applied to the CNT pin. After 8 CNT clocks, the data is passed into the serial data register and a Serial event signalled in the ICR, bit 3. If enabled, this will cause an interrupt.

In output mode, data is shifted outcombe Spin at half the underflow rate of TIMER A which is used as the shift-rate clock. The shift register will begin operating as soon as the data begin operating as soon as the data register, assuming TIMERA is running and is in continuous mode. Once all 8 bits have been shifted out, a Serial event is signalled to indicate more data may be sent if data has already been written to the SOR the processor data may be sent if data has already been written to the SOR the data flow will be continuous.

The maximum data shift rate lbaud rate) possible is the system clock rate divided by 4. In our case this is about 250,000 bits per second (more on a C128 in 128 mode). This maximum rate may be affected by what you have connected to the SP line and how fasty our receiving device can accent the data.

The most interesting aspect of the Serial system is the ability to connect several CLA's together on a common serial communications bus. Both the SP and CNT pins are able to be connected in such a fashion.

Let's assume that you have several computers (64 or 128's) whose serial CIA outputs are connected together, in order to requisite the flow of data, one CIA must act as a "master" device. You could for example have only one disk drive connected to the master programs between this and the other machines. The master thus becomes a "File-Server," accepting requests to load or save programs from "client" load or save programs from "client" machines. What you end up with is a

There are a number of ways to approach the problem of writing a network operating system. One method is to have the File Server to send enquiry messages to each client in turn to ask if it requires attention. If the client requires a network service, it may now tell the fileserver what it may now tell the fileserver what it

needs; e.g. load a program, save a program, etc.

This is fine assuming that the clients do not require continuous attention from the server since it is possible for one machine to grab the network of an extended period of time, locking out the other clients, it also means that if the server has a number of machines to cater for, it could be some time between each enquiry to a particular machine.

Another method is for a client machine to send a message to the server when it requires attention. This leads to a more efficient "as needed" service for the clients. The disadvantage is that there is the possibility that two or more machines may try to communicate with the server at the same time. Some way must be found for a client to detect that someone else is in communication be to set the otherwise unused TIMER B to check if the CNT pin is active. We can program CRB, and therefore TIMERB, to count CNT positive pulses. If we set up TIMER B just before we attempt to send a message, we can check to within a few microseconds of transmission if anything is happening on the bus.

How would each machine know that a message being sent is meant for it? Well, each client machine would have an ID number (station number) and every message sent over the bus machine's ID number. It may also have the ID of the transmitting machine is ID number. It may also have the ID of the transmitting machine to identify the party responsible. This means that there are some operations which the Rieserver would not be involved with such as company of the party message from one company of the message from one company of the party.

When using the serial system, we are concerned mainly with the following registers;

Serial Data Register
Timer A register pair
base+\$05
base+\$05
Control Register A
base+\$05

Control Register A base+\$0E Interrupt Control Reg base+\$0D

Bit 6 of CRA controls the serial port mode; 1 = output, 0 = input. Bit 3 of the ICR is the serial event flag/enable. The TIMER A pair should be programmed with the value required for the shift rate!

Although the data flow rates would be matched as closely as possible, they need not be exactly the same since it is the transmitting machine that outputs the signal that times the transfer.

Serial Port Programming

Unfortunately, unless you have three or more machines available, there isn't really much point in setting up a network. What I will do here is to show some basic programming concepts for the serial system. The technique used to program the serial port is not unlike that used for the parallel port described earlier.

may help you see how the system works.

Fig 9. Serial Transfer

Program 9 20 10 CIA=56576 30 20 POKE CIA+4,255 40 30 POKE CIA+5,0 50 40 POKE CIA+16,5 60 50 INFUT R\$ 60 60 R\$-R\$+CHR\$ (13) 80 70 FOR I=1 TO LEN (R\$) 90 80 POKE CIA+12,ASC (MID\$

(R\$,I,1))
90 IF (PEEK (CIA+13) AND 8)=0
THEN 90

ing it to operate the parallel port instead.

Both programs live at \$C000 and should be started by SYS 49152.

10 ; 20 ; CIA SERIAL 30 : SEND LINDER INTERRUP

; SEND UNDER INTERRU

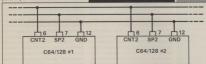
CA FOA COO

0 :

00 .START JSR INIT

110 .GETIN 120 JSR INPUT

40 STA SFLA



CONNECT OTHER MACHINES IN SIMILAR FASHION

For the transmit phase, the portis set for output, you write a data byte to the data register and wait for a flag in the ICR to indicate data may be sent again. For the receive phase, it stars again to the ICR to indicate data has larging and the ICR to indicate data has been sent as yet form the data register. The major difference is the use of TIMERA to clock the transfer.

Take a look at Fig 9. Programs 9 and 10 are similar to programs 1 and 2 in that they are simple BASIC data transfer programs, but using the serial port instead. I have used a moderate transfer and open control to the position of the programs of the programs 1, but remember that, unlike the papalled lines and list therefore possible to lose data if your receiver cannot process the event quickly enough. To be honest, this is best handled by machine code, but these programs machine code, but these programs

These programs show the ba method of using the serial port.

Program 10

50 GOTO 30

10 CIA=56576 20 POKE CIA+14.0

30 IF (PEEK (CIA+13) AND 8)= OTHEN30 40 PRINT CHR\$ (PEEK (CIA+12));

Programming the Serial System Using Interrupts

If you did go on to write some sort of Network Filing System (NFS) then you would probably need the serial port to be interrupt driven. On the 64, you have to access to serial ports on both CIA 1 and CIA 2. Using CIA 2 is probably wisest since it generates NMI's rather than IRO's.

Program 11 allows input from the keyboard and then sends it out via the serial port under interrupt. Program 12 receives data from the serial bus under interrupt and isn't all that different from the parallel version forogram 4). You could try convert160 LDA BUFFER,Y 170 CMP #"*"

180 BEQ EXIT1 190 STA CIA+12 200 WAIT BIT SFLAC

210 BMI WAIT 220 JMP GETIN

240 ; 250 .INIT SEI

250 .INIT SEI 260 LDA #<INTR 270 LDX #>INTR

290 STX \$0319 300 LDA #\$88

310 STA CIA+1. 320 LDA #SFF

340 STA CIA+4 350 STX CIA+5 360 LDA #\$41

370 STA CIA+14 380 LDA #0

400 CU 410 RTS

> 430 .INPUT LDY #0 440 .IN1 JSR \$FFCF

Program 11 Operation

The program initialises in the routine INIT. The NMI vector is altered and the CIA2 serial interrupt enabled. The SFLAG variable is used to signal to the NMI routine that data is ready to go out and we initially set it to zero. We also set and start TIMER A and set the

After data is received from the keyboard, the data index pointer is set to 1. SFLAG is set to \$80 (data to the serial data register in order to start up the system. When the last

begins again with keyboard input. entering an asterisk as the first

Program 12 Operation

the serial system except that we set it for input. The program waits for a line of data to be received via the NMI interrupt then prints it out. SFLAG indicates the current state of affairs; SFLAG = 0, no data: SFLAG = 1, data received and ready

looping around like I have done here. You can periodically poll the byte to see if data has arrived and take any

I hope you will be able to see the possibilities afforded by the serial system. The examples will, I hope, help you understand how it works. Writing network system software is a challenge for most of us and I wish you luck if you do try it. Your biggest problem may be getting hold of enough machines to test it out!

That just about wraps up the 6526 CIA. The examples I've given you are perhaps not the most exciting in some cases but I believe they do show how to program the device. Next time, we will take a look at the Plus 4's facilities and there may be a surprise or two in sore for some of

Codemaster

Andy Partridge looks at a comprehensive machine code utility from a new development house

The North of England seems to be produce more software companies than anywhere else on this fair island of our. The latest is a company called 'Diamond Bytes', specialising in utility programs of good quality at a reasonable price. Their first release is a machine code utility called 'Codemaster'. This program is qualled 'Codemaster'.

I must admit to never really using a Debugger before this, I always took a printout of my code and skipped through it by hand! Codemaster is an excellent utility that does this for you, and I'll be using it instead of 5 feet of

printer paper from now on! To use Codemaster, you first get your machine code program into memory, either by loading the file in need to do it doesn't matter; You could even reset a commercial product and have a peek at what's going on! Next you load in codemaster and run it. If codemaster is somewhere you don't want it to be in memory, a command will make it move itself to somewhere else to avoid memory clashes. Once you've loaded and run Codemaster you will get 10 lines of disassembled code, the address Codemaster is at, the contents of the X. Y and A registers and the Status register shown and a command line. All the 6510's flags and registers can be changed from within the program,

SEI will set the interrupt flag etc. and the A X and Y registers can be altered with any LDA/LDX such as LDA \$AOOO_X or LDA (\$34),Y they all work! In fact, you can enter any 6510 instruction from within Codemaster except the branching commands. Windows' can also be opened to show ASCII in memory.

If you want to 'Run' the program that is in memory, you must first go to the start of it with a JMP command. The 10 line display will then show the first ten lines of your program. You can single-step through the program with the RETURN key, or by pressing F1 which will run until an RTS is met. This is useful for by-passing a subroutine that you know works, or to skip a Kernal routine (Which you hope works!!] As Codemaster passes an instruction, it carries it out. All the registers are changed to show you what state the processor is in at that time, and any branches, JSR's or JMP's make Codemaster jump to that section of memory and display it.

If you want to stop your code at a certain address, TRAPS can be set to halt the progress of Codemaster through your program. Alternatively. Run/Stop can be used to halt the flow of a program (if you are quick enough to stop it where you want it!)

Another great feature of this

program is that it lets you assemble code into memory, entering a PTC \$000X instruction points the 10 line assembling at the specified area of code, and then all instructions entered will be assembled into memory, lilegal expressions won't assemble, and you can jump back and step through it in the same way as above.

If the screen gets corrupted by the program you are running, press-

ing F5 will get it back. F7 performs a warm start and F1, as I said above, runs a subroutine.

The manual comprises of an introduction, an overview of the 6510 processor and then a series of futorials to teach you how to use the program. The tutorials teach well, with the exception of a lack of explanations for the F-Keys in an easy list... They are dotted through the text have whole instruction manual is quite easy to read, with three examples for you to look through on the disk to get you to look through on the disk to get you

And to end with, a list of features you may be interested in as a serious

- + Memory Hex dumper
- + Machine code Trace Utility + Single step or Walk mode
- + Sequence run mode + Direct machine code mode
- + Code editina mode
- + External patching mode
- + External program access
 - Screen, Keyboard and Interrup routines

To be fair I have not given this program it's due justice. Alot more could be said of it's capabilities. It is a long time since I have had such a good utility in my hands and for it's price it must be considered a must for all serious machine code programmers.

AT A GLANCE

Suppliers: Diamond Bytes, 7 Grah Avenue, Brinsworth, Rotherham, S

Price: £15.95 (Disk only

Personal Organiser Page Printer

especially for the C128

By Paul Traynor

ersonal Organiser Page Printer (POPP) is a program which enables the user to produce pages which match the format of common organisers. You have the ability to give your pages a main title and footer along with up to 3 separately titled columns. Page details can be stored on disk for later retrieval. A Commodore C128, 80 column monitor and printer are essential.

Operation

Use of POPP is very simple with just 2 menus, the first has 5 options:

- 1. Create Page
- 3. View Page 4. Disk Functions

5. Exit Program

After selection of the Create function you will be shown a representation of the current page in memory (if any) you are then prompted for the title information starting with the main title, then the number of columns (1-2) and then their titles and finally the

The Print function will put the completed page on paper. The View function allows you to view a scaled representation, scaled so that it will fit onto one screen. The function will cut down unnecessary paper usage

Selecting Disk Functions will take you to the disk functions menu. Exit Program, you are then asked if you are sure for safety

The Disk Functions menu has 4 op-

- 1. Device Number and Disk Directory 2. Save Page
- 3. Load Page
- 4. Exit disk Functions Option 1 allows you to choose the

device number (default is 8) and also displays the directory of sequential files that begin with POPP. The Save function will store the current page details to disk. If a file exists with the same name then it will be replaced.

The load function will load a page into memory. When using either load or save you do not have to enter the filename prefix (POPP). Exit will take you back to main menu.

POPP should work with any Commodore compatible printer. The final printout will be a lined page with your titles and footers. (Printouts will be in near letter quality if your printer supports it). The page just needs to be cut out and the 6 holes need to be punched in the positions which are marked. On the disk are some example pages which show what can be done with Personal Organiser Page Printer

C128 PROGRAMMING

We give you a couple more By Paul Traynor

onvertor and Maths Aid has as the name implies, two distinct parts. The first is a full functions metric and imperial converter, part two is an electronic Log and Data book. Functions include support for disk drive and CBM printer. Converter

The six converter options can be selected from the main menu, these are length, area, volume, mass, velocity and temperature. These are all standard metric and imperial conversions except temperature which is a three way conversion, le Celsius, Fahrenheit and Kelvin. After picking your

selection from these pages you are given a sub-menu showing all the possible calculations etc. inches to millimetres or cubic metres to cubic feet. After selecting your particular conversion you are prompted for an input value and after pressing return

you will be given the solution. At this point you can either do another conversion of the same type or return to the main menu.

Maths Aid

After selection of this part of the program from the main menu, you are presented with the following options: trigonometry, functions; logarithms, squares, roots and reciprocals; and degrees and radians. Each one will will show the actual calculations available. For example Natural Logarithm or Inverse Tangent. If you are working with the trigonometry functions it will be necessary, when prompted, to enter whether you are using degrees or radians for measuring your angles. The main difference

outween this part of the program and

ne Converter part is that after giving

tabular form like an extract from a Log

Book. This will be up to 25 calcula-

be integer parts of inputed values,

along the top row will be the decimal

parts of inputted values. An example

below

ns, down the left hand column will

To use the table you line up the row which begins with the integer and the column headed by the fraction, the point where they cross will give you your answer. If you are calculating an inverse cosine or similar then the actual value that you input will be in the main body of the table while the answer will be formed from the first row and the first column.

Disk and Printer Functions

You can have a hardcopy of the Conversions and/or the Maths Aid calculations that you have carried out by selecting these options from the menu.

You can also have a copy of your conversions or calculations, to disk. as a sequential file which can then be read into your word processor. For saving to disk you will have to enter a device number and a filename

You will find the programs associated with the above on the disk. Make sure you are in C128 mode before

1581

Direct Access

Following on from the 1581 toolkit review. Paul Traynor puts some practical theory to

1581 Direct Access

The Direct Access commands provide a means to read, write and alter the data on your disks by track and sector. Using Direct Access commands gives greater flexibility when programming but generates more work for the programmer, who has to perform file management unlike when using program, relative or sequential files when data is already DOS organised. Uses for Direct Access commands stretch from simple locking/unlocking files to creating a full blown data management program to suit your needs

General Rules

Firstly it is wise to use a blank disk to avoid corrupting data by mistake. It is a good idea to have a sector editor close at hand, these can be extremely useful in carrying out simple tasks. The one supplied on the 1581 Demo/ Utilities disk is adequate. It is also a good idea to check the error channel after rear or write operations.

Direct Access Commands There are several different commands

for block-read and block-write, these are split into three distinct types, below these are listed in the same order as in your 1581 user's quide:

User commands

READING

Firstly we have u1 or ua these commands can be executed in any of the following formats, they allow the user to read a complete block. u1 can also

PRINT#15, "U1"; CHANNEL #; DRIVE #- TRACK #:SECTOR #

PRINT#15, "U1: CHANNEL #, DRIVE TRACK #, SECTOR #"

PRINT#15, "U1:" CHANNEL #; DRIVE #: TRACK #; SECTOR # The program shows an example of

the block read command. You can read any track and sector of your disk and it will be printed on screen. It is assumed throughout that the 1581 is set at device number 9, if this is not so, the open statements in lines 20 and 30 should be altered.

10 INPUT "ENTER TRACK TO READ"; TR:INPUT "ENTER TO READ"; SE 20 OPEN 15.9.15

30 OPEN 5,9,5, "#0" 40 PRINT # 15, "U1": 5; 0; TR; SE

60 GET#5, A\$:IF A\$="THEN AS=CHRS(0) 70 POKE I + 7936, ASC (AS):PRINTAS:

80 NEXT 90 CLOSE5:CLOSE15

WRITING

Similarly we have u2 or ub for writing whole blocks. Again there is a host of different formats to choose from. u2 can also be replaced by ub.

PRINT#15, "U2"; CHANNEL #; DRIVE #; TRACK #; SECTOR # PRINT#15, "U2:CHANNEL #, DRIVE

TRACK # SECTOR # PRINT#15, "U2" CHANNEL #; DRIVE

TRACK #: SECTOR # The program shows an example of the block write command. You can

write data to any track and sector of your disk up to a maximum of 256 characters per block. 10 INPUT ENTER DATE TO BE

WRITTEN"; NAS 20 INPUT "ENTER TRACK"; TR 30 INPUT "ENTER SECTOR"; SE 40 OPEN 15, 9, 15 50 OPEN 4. 9. 4. "#" 60 PRINT #15, "B-P";4;0 70 PRINT#4, NAS

90 CLOSE4:CLOSE15

All of the U commands will check for errors in the designated track and sector and will report any errors in user's input.

2, No error checking

Reading

Secondly we have b-R, this command will allow the user to read a complete block but it does not perform any error checking. Below are the formats for this command which can be used in the first block read program by replacing line 40.

PRINT#15, "B-R"; CHANNEL #; DRIVE

#: TRACK #: SECTOR # PRINT#15.*B-*:CHR\$(210)CHANNEL #:DRIVE #:TRACK #;SECTOR # PRINT#15. "B-R:" CHANNEL #; DRIVE #:TRACK #:SECTOR # NOTE: R IS SHIED

Writing

Similarly we have b-W for writing whole blocks. Once again the formats below can be used in the first block write program by replacing line

PRINT#15, "B-W"; CHANNEL #; DRIVE #-TRACK #:SECTOR # PRINT#15, "B-"; CHR\$(215); CHANNEL

#: DRIVE #: TRACK #: SECTOR # PRINT#15. "B-W: "CHANNEL #: DRIVE #-TRACK #-SECTOR # NOTE: W IS SHIFTED

3, Original Commands

Reading

Thirdly we have the so-called original block read command, with this command it is not possible to read a whole block because the first byte is read as a marker to determine how much of the block is to be read. Two formats for the command are shown along with an example program. In the example the variable st is used to indicate the end of the data when it changes from 0 to 64

PRINT#15."B-R":CHANNEL #:DRIVE #: TRACK #; SECTOR

PRINT#15. "B-R:" CHANNEL #:DRIVE #; TRACK #; SECTOR # 10 INPUT "TRACK TO READ"; TR 20 INPUT "SECTOR TO READ"; SE 30 OPEN 15,9,15 40 OPEN 5.9.5, "#0" 50 PRINT#15, "B-R";5;0;TR;SE 60 FOR I=1 TO 256

70 GET#5,A\$:IF A\$="THEN A\$=CHR\$[0] 80 POKE I+7936,ASC[A\$] 90 printa\$;:if st=64 then 110 100 next 110 close5:close15

Writing

We have a corresponding original block write command where the first byte is set as a marker to indicate the number of bytes recorded in the block.

PRINT#15, "B-W"; CHANNEL #; DRIVE #; TRACK #; SECTOR # PRINT#15, "B-W:" CHANNEL #; DRIVE #; TRACK #; SECTOR # 10 INPUT "ENTER DATE TO WRITTEN": NAS 20 INPUT "ENTER TRACK": TR

30 INPUT "ENTER SECTOR";SE 40 OPEN 15,9,15 50 OPEN 4,9,4,"#" 60 PRINT#4 NAS

70 PRINT#15, "B-W"; 4; 0TR; SE 80 CLOSE4 90 CLOSE 15

It is important to note that, although it is possible, it is not at all advisable to mix block commands and original block commands in the same pro-

Buffer Pointer

Setting the buffer pointer determines where any reading or writing will commence in the block. This is used for accessing individual bytes and can also allow the user to organise the blocks into fields similar to relative files. Three allowable formats are

PRINT#15, "B-P": CHANNEL #; BYTE PRINT#15, "B-P: CHANNEL #; BYTE" PRINT#15, "B-P: "CHANNEL #; BYTE

The example program allows the user to change the id of any disk on the 1581. The disk id number is stored in three places on the disk these are all catered for in our example which shows the buffer pointer command

10 INPUT "ENTER NEW ID: ";ID\$ 20 OPEN 15,9,15 30 OPEN 5,9,5, "#"

40 PRINT#15, "U1";5;0;40;00 50 PRINT#15,"B-P";5;22 60 PRINT#5,ID\$; 70 PRINT#15 "U2":-5-0-40-00

70 PRINT#15, "U2";;5;0;40;00 80 PRINT#15, "U1";5;0;40;01 90 PRINT#15."B-P":5:04

90 PRINT#15,"B-P";5;04 100 PRINT#5,ID\$; 110 PRINT#15,"U2":5:0:40:0 130 PRINT#15, "B-P",5;04; 140 PRINT#5,ID\$; 150 PRINT#15,"U2";5;0;40;02 160 CLOSE 5 170 CLOSE 15

Allocating Blocks

This allows the user to mark the blocks which he has used so that they will be written over by other disk accessing such as saving program files, however, these will be cancelled by a validate or collect command. Two

command formats are shown.
PRINT#15, "B-A"; DRIVE #;TRACK #
:SECTOR #

;SECTOR # PRINT#15, "B-A..."DRIVE #;TRACK #;

The user guide provides a good example of the Block Allocate command, which will select the first available block and then tell you which one it has chosen. Our example allows you to input your track and sector and will then report any errors.

10 INPUT "ENTER TRACK TO ALLO-CATE: ";TR 20 INPUT "ENTER SECTOR TO ALLO-

CATE: ";SE 30 OPEN 15,9,15 40 OPEN5,9,5"#" 50 PRINT#15, "B-A";0;TR;SE 60 PRINT EN;EM\$;ET;ES

70 CLOSE5: CLOSE 15 Freeing Blocks

This command allows a previously allocated block to be freed. It works by updating the block availability map. As with block Allocate two command formats are shown.

PRINT#15, "B-F"; DRIVE #; TRACK #; SECTOR # PRINT#15, "B-F..." DRIVE #: TRACK #:

SECTOR #
Once again our example is a simple one which allows input of track and sector to be freed.

10 INPUT "ENTER TRACK TO FREE:
";TR
20 INPUT "ENTER SECTOR TO FREE:

",SE 30 OPEN 15,9,15 40 OPEN 5,9,5,"#" 50 PRINT#15, "B-F";0;TR:SE 60 PRINT EN;EMS;ET;ES 70 CLOSE15 Partitions

The one great advantage of the 1581 drive over its predecessors is its ability to create partitions on the disk. Uses for partitions include reserving space for your own data manipulation programs, and probably the most population programs.

lar sub-directories.

We have already discussed the Allocating Block command and how it will be overwritten by a validate or collect command. Partitions provide a work area which will not be overwritten by such an instruction. The best way to produce partitions is to use the Partition Aid utility supplied. but below are the commands for addition in your own programs.

NAME, "+CHR\$ (TRACK#) + CHR\$ (SECTOR#) + CHR\$ (X) + CHR \$(Y) +

",C"
WHERE
Y=INT (N/256)
X=N-Y*256
N=NUMBER OF BLOCKS REQUIRED

The following command will select a partition from the root directory PRINT#15,*/0:PARTITION NAME*

You can use the partition as it stands, with no sub-directory, but you will have to use the block read and block write commands which do not check for errors as mentioned before.

After creating and selecting a partition you can format with the following command.

PRINT#15, "NO:PARTITION NAME,ID

If you wish to create a sub-directory
for your partition it must comply with
the following rules:

The partition must be at least 120 blocks in size.
 The first sector must be 0.

The total number of sectors must be a multiple of 40.
 The partition area must not contain.

The partition area must not contain track 40.

Below is a simple program which allows the user to produce any size of

Below is a simple program which allows the user to produce any size of sub-directory with the start at track 1. 10 INPUT "NUMBER OF BLOCKS RE-QUIRED IN PARTITION";N 20 OPENS 5,9,5 30 OPEN 15 9 15

30 OPEN 15,9,15 40 Y=INT (N/256); X=N-Y*256 50 PRINT# 15,"/0: PARTITION NAME, "+ CHR\$ (1) + CHR\$ (0)+ CHR\$ (X) + CHR\$ (Y) +".C"

60 PRINT#15, "/0:PARTITION NAME" 70 PRINT#15, "N0:PARTITION

NAME,ID"

Finally

On the disk are 8 very short demonstration programs covering the topics mentioned here. Make sure you put your computer into 128 mode before attempting to look at them.

Muncher

Just when you thought you had seen the last of the Pacmen they reappear more hungry than ever By David Bryson

he scientists at Washington are a clever bunch. After genetically engineering an animal to get rid of the current drugs pushing problems, you have taken form as a fat yellow beast nicknamed the Muncher. Your mission Jim, is to eat all these horrible drugs lying around the Washington depots and eliminate the crisis for years to come. However in these depots remains the chosts of



earlier drug takers, who certainly don't like you hanging around. But not to worry... the scientists devised a plan of sending fake dealers into these depots to scatter plasma capsules all over the building. (You see the drug pushers didn't notice the difference).

Plaving Muncher

To play Muncher, you move your man around the maze gobbling all those nasty drugs, and avoiding those nasty nasties. However, when you eat a plasma pill, you can get your own back on these hornible ghosts by gobbling them up. But unfortunately the plasma energy in the pills is only sufficient to last up to 5 seconds.

sufficient to last up to 5 sections.

Muncher is played with the joystick in PORT 2 using the normal
movements lie. left to move left, right
to move right etc.], but the FIRE button is NOT used. If you can't hack the
pace, you can PAUSE the game with
any key [except COMMODORE and

FF which changes the SPEED of the game, and RUN/STOP which OUTS the gamel. To continue, press any key, in total there are 15 depots of action to complete, with a BONUS-BUILDING at the end. At the start you have 4 men at your disposal. Can you munch your way to the last level without being caught four times? (By the way, this game has been protected against disabling collision, exwith cartificipes, so don't try to cheal!)

The high score table

Well, if you don't manage to save the world, don't worry, your name's still going up in lights. To enter your name on the Hall of Fame, you move the joystick up or down to select a letter, and then press fire if it's the one you want. To finish quickly, you can press right and this will act as a Return You.

This is the first game I have made (at 14) and so I hope that you enjoy It. May Muncher live for thousands of years to comel Right, now stop reading, and get playing the gamel [Hellos go to SCUM U.K. and VIDEO 1-FM. from THE NAMELESS ONE of REVO-LUTION).

REVIEW

MYTH

Gordon Hamlett examines the latest from System 3 software.

very civilisation has as own of order to a control of the Norsemen and so on. These detects controlled the flats of every mortal on Earth. Heroes performed great fleats or bravely against evil demonst and malevolets spar of rubberh any more do we't life today is more concerned with mundame matters such as whether Manchester City will stay in the First Division or how to cope with the ever increasing number of Junk fax messages control place of the control of the cont

One boy believed though. On the face of it, a perfectly normal youth popular with his friends at school but the bane of his history teacher's life for his abnormal obsession with classical mythology, As it happened the Titans (for they do exist) were looking the Titans (for they do exist) were looking the Titans (for they do exist) were looking between the properties of the Titans (for the present and the Titans (for the Titans (

Starting off armed only with your Starting off armed only with your lighting imps. He will drop ye olde flame thrower allowing you to throw a limited number of fireballs at future enemies. (Further hits on the imps will restore your health). Next, it's case of zapping a few skeletors until one of them drops a yword. You can

then use this to cut down a skeleton in chains. Follow him down to the bottom level, kill him with your sword so that his head falls into a fiery chasm. This will release a demon. Kill him with the fireballs, pick up the trident he drops and use that to kill the huge creature at the end of the first level.

game, it is simply a case of finding a seapon and using it in the right place. Thus damint being decidedly underwhelmed by the game, especially after all the type and frave reviews' about it. I didn't find the screen particularly exciting and less escreen to East Lakes for ever to load in after you die. Sall, other people seem to like it so you may do so to too.

AT A GLANCE

Title: Myth Supplier: System 3

Price: £9.99 (cassette), £14.99 (dis

THE 1581 TOOLKIT





We put a utility program fo the new 1581 disk drive through the mill By Paul Traynor The 1581 Toolkit is a collection of 10 disk utilities, but it is not just this as the package also includes the 1581 DOS Reference Guide and some other utility programs including Kracker-Mon. The Toolkit is for the 64 but will also support 64k VDC RAM or 1750 RAM expansion when used in 64 mode of

When the Toolkit is booted, after showing you a nice picture of two 1581 drives, you are presented with the initial menu showing the 10 modules to choose from. (pressing between the menu and the picture of the two drives) Once you have booted the Toolkit, subsequent loading of modules or reboots of the main system will be from the same device number as initially used. The first module is the Fast Datacopier which will work with either one or two 1581 drives, when you are using only one 1581 and a 128 this module will support the 64k VDC (for 7 pass copying) or 1750 RAM expansion (for 2 pass copying) to speed up operation time. In my tests a full disk copy using one drive and a 1750 RAM expansion took approximately 5.5 minutes. When you start the copying procedure the source disk is checked and if it is not write-protected the program will pause and tell you so. When copying is complete the program reports any read or write errors that may have occurred. The disk command option will allow the sending of any command to the drive that would normally require the 'open 15,8,15, type of statement, examples of these are validate, new and collect. This ability to send disk commands is available in all of the modules. Other options on the Fast Datacopier menu are selecting first and last tracks for partial disk copies and also Reboot main menu. The next module is the Fast File copier and it is here that we find the program's first bad point and it is very important because although this file copier will work with one or two drivers and transfer from 1541/ 71 to 1581 and vice versa it will not have anything to do with relative files which is very sad if your database. like most, produce such files which you may need transferring. Support is provided for 1581 sub-directories, softwiring of drives (le changing the device number temporarily), and VDC

You also have the ability to format the destination disk before file copying. If you are using a 1541/71 you can alter the skew rate, this is fully explained in the manual but it has not

and system RAM expansions.

been too successful in my tests. As well as the reboot main menu selection you can also opt for exiting to BASIC. The copying procedure prothe form of a bar chart. The vertical scale represents the size of the file and the bar charts grow one at a time as each file is loaded and subsequently shrink again as each file is saved to the destination disk, the screen scrolls horizontally to accommodate any number of files. One useful feature of the filecopier is you can move files from one sub-directory to another on the same 1581 disk, this is done by selecting both source and destination drives as the same number but choosing the required sub-directories. If you try to copy a file onto a directory or sub-directory where it already exists you will be given the option to choose another name for this second

The third module is a Directory Editor, after loading the directory and selecting the edit directory option you are presented with the edit screen. This screen has space for an input buffer, where your directory will be at first, and an output buffer which shows the directory which you can write back onto the disk. Using cursor keys you can move around within either buffer or between buffers changing the positions of files. As you point at each particular file it's information is shown at the top of the screen. This information includes the filename, type (rel, seg etc) and status mation can be altered. You can sort files alphabetically and numerically directory

Other options include the ability to change the main disk title and id. Module four is a Track and Sector Editor which has the facility to edit your data in a number of different ways, these are ASCII code, assembly language or in hexadecimal format, data used in the last two editing modes can be printed out on paper. The editor has all the necessary scanning commands ie. next or previous track, sector or link. The Track and Sector Tracer, module five, allows you of a file block by block. This editing can be done in either disassembly mode or Hex/ASCII mode. After read-

ing the directory and selecting the file you wish to work on, you will be presented with a grid which shows a representation of how the file is stored on disk, ie you can see which blocks are allocated to it, using the cursor keys you move within these blocks and select one for editing in the modes outlined above.

Module six, a Pattern Searcher or Fast Data Scanner, this module will search any number of tracks up to a whole disk for data which you can enter in three different forms Hex decimal or ASCII or a combination of will be displayed and then you will be shown a grid which indicates which blocks on the disk contain these matches. You can display and edit ASCII mode and whilst in these modes be highlighted. Module seven, the Partition Creator, is described in the manual as fun to use and it is. The approach used to manipulate your partitions is very interesting. Across the top of the edit screen are the tracks from 1 to 80 and partitions if any, will be shown hanging down Your movement across the screen is restricted to the tracks taken up by the level you are at, this level is displayed at the bottom of the screen together with the options; create, delete and read partition. Although this may sound difficult it is very easy to get used to and extremely useful if you use multiple levels of partitions and sub-directories. Module eight is a Fast Formatter, when I tested it, it took 20 seconds less to format a disk than the standard 128 header command. It is also possible to select a range of tracks for a partial format of your 1581 disk. Module nine is an Error Scanner which will determine whether a disk contains DOS read or write errors. The results can be dumped to printer or displayed on four screens which are switched between by using the keys 1-4. These results will show whether or not a block has been used. If a block contains an error an indication is also given as to which error is present. You are given the option to change start and end sectors for partial disk scans. The final module, number ten, is a Re-Locatable Fast Loader which boasts 900%

faster loading of program files which in my short tests I found to be true! The fastloader can execute from different memory locations to suit the user, and the necessary files can be saved onto any work disk 1541/71 or 81 format but is only compatible with

As already mentioned the 1581 Toolkit package also contains the 1581 150 pages of text describing the makeup and operation of the 1581. All the guide is expanded in this publication disk commands available, auto loaders, utility loaders, the disk format utility commands. The aspects of cache buffer, the serial bus specifications, standard, fast and burst serial bus protocol and 1581 bugs. The bulk of the book is the memory map which is split into three main areas; firstly 8k of RAM (which includes zero page work area, job queue, the data buffers and the BAM), secondly the DOS controller routines (which includes 8250A and WD1770/2 information) and thirdly the ROM memory map. The documentation also outlines the use of the additional utilities which are included in the package. the main one of these is Kracker Mon which is a machine language monitor. Other utilities are an error creachanging suitable program files to user files, example utility command and auto boot files and a program which dumps disk drive ROM to disk

The package is not cheap but despensed properties of the package and the package, as I have already mentioned, it is more than just a disk utility program. The support for VDC and system RAM expansion means this package is worth considering for 128 users as well as 64er's. The very thing for those who appreciate the extra disk space and pleasing quiet operation that the 1581 drive offers.

Suppliers: F.S.S.L. Masons Rhyde, Defford Road, Pershore, Worcs Telephone: 0386-553153 Price: £34.95

Techno



Despite its sometimes lengthy appearance, Techno-Info proves as popular as ever. Jason answers a few more letters.

Dear CDU,

I recently ordered a back issue of CDU which I have just received. One of the programs on the disk is CDU MENU KIT. I have used this and found that after I have made up the menu with my selected colours etc. and saved it onto my disk, when I re-load my menu the "Commodore Disk User" logo is the wrong colour and the moving

striped effect doesn't work. At first I thought it may be a fault with my computer but I have tried it on my friends and it still does not work. I have also loaded your menus from other CDU disks and the logo on those are the wrong colours as well. I have found that if I load 'Directories Explained' [Vol. 3 No. 4] then load and read through the

Main Demonstration, when the computer comes to the end, if I then load my menu without resetting the computer the striped effect and the colours are fine. Could you please tell me if there is a bug in the CDU MENU KIT program and if so what I have to do to correct it. R. Barker. Northampton

Dear Mr. Baker.

Like the problems with the game Wabbit that I discussed in the April the program. With the older models. ground colour at the time. With the newer models, the values stored depend upon the cursor colour. The menus relies on multicolour characcolour 6 and so this is the colour that and so the characters are not multicolour. Hence the effect is not obprogram of use, even if it did only load the menu. However, after a while this issue's disc you will find the file (PROBE1". Load and run it as a BASIC one that will be created and will wait. The computer reads from the ing two significant bytes where needed. The whole process takes a altered changes the cursor colour prior will change the background colour instead. Of course this only works on the old models that don't usually produce the colour rolling. To all programmers out there I send the plea that you must remember that old 64s POKE colour differently when clearing the screen. I hope this routine will be of use to everyone who owns the old models.

Dear CDU.

I am currently creating a demo which uses a high resolution screen combined with sprites to give the effect of movement. The demo is of a face, speaking fluently with the help of the sprites as mouth movement. The problems started when I couldn't find a single sound sampler on the shelves at a reasonable price. That is when I wrote to you, hoping that you will be able to recommend a relatively inexpensive sampler. That is if it is possible to have sound sampled speech continually speaking at the same rhythm as the mouth in the demo. Maybe you could continually load in speech as it is executed or load in a long string of speech to be played and updated at intervals. If you could answer this query I would be most grateful. Lee Bamber, Wigan.

Dearles

I am affaid that you won't find a decent Sound sampler on the market at a lower price than about fifty pounds, unless you want a synthesised speech program or separate module to produce the speech but ment will be able to use your demo // Unforturately where is more bed news. Digital Sound Samplers eat away at the memory like nothing on earth. I have a nime second sampler of a song and to occupies over 20K. The timings and to occupies over 20K the timings bed to keep loading the speech, unless there were long pauses. Sony to less phere were long pauses. Sony to make a first class job you will have to make a first class job you will have to make a first class job you will have to make a first class job you will have to make a first class job you will have to make a first class job you will have to me seconds worth of speech.

Dear CDU.

I have just two queries. I am moving to Canada and would like to know what modifications I would have to make to my system. Do I have to change the voltage and if so how do I go about this? Secondly, I own a 1520 plotter but one of the pens has run out and no dealer I know sells these pens, can

you help me here? Yasin Pontani Middlesex

Yasin Poptani, Middlesex

Dear Yasin.

Would think that the only thing that would need to be changed is the would need to be changed is the control of the changed in the Changed output for the 64. However, I would falk to a qualified electrician on that who could let you what exactly it entails. Four second query (can be obtained a new set of pers from HSE. Electronics. Their address is Garretts Green Liane, Birmingham 83.0 Up. and the telephone number is 021-789-7575. Other than that conspany there are a few Tandy shopp that and place of the changed in the change of the chang

Dear CDU,

I own a Commodore 64 and 1541 disk drive, with which I am now experiencing problems. I can use the disk drive with no problems for months and then suddenly the drive comes up with an error number 27 - a read error. The program will either not load or the drive working light stays on continuously and the computer will not reset. Sometimes the directory will load and when viewed the filenames are changed to graphics characters. If the drive is left for a few weeks it will sometimes load normally. At other times, the disk has to be reformatted. I find that most disks will then work with no problems. I hope that you will be able to help with either information on how to cure the problem or how to uncorrupt my disks. The computer is approximately six years old and the 1541 about eight.

G. Collins, Surrey

Dear Mr. Collins,

From what you have said I would think that the problems lie not with the disks but with the drive itself. I cannot see how a disk can work one minute, not work a few months later and then work again at some future date if the disk is corrupt. I should think, and without trying one of your disks I can't be sure, that the drive is not aligned correctly. This is quite

possible after eight years of use. You may benefit from trying one of your disks that does not work on a friend's disk that does not work on a friend's take it to a computer shop and ask them to check the head alignment and motor speed which should be in the region of 300 pm. The reind not soft the region of 300 pm. The reformatting is because if the head has becomes fluck, the knocking that correct the head position. As I say, get the 1541 checked out, or possibly buy a new drives.

Dear CDU.

I recently acquired an EPSON RX80 printer and set about connecting it to the user port of my C128D which I use in the C64 mode most of the time. The connection to the printer is via approximately two metres of ribbon cable. There is nothing wrong with the RX80 - it works a treat. But I have found that when the RX80 is connected to the user port I cannot load some of my software from disk. For example the CDU menu produces about ten lines of garbled ASCII and with another of my programs the drive runs forever but the title screen never appears., Even with the RX80 powered down but still connected the problems persist. The only solution I have is to leave the RX80 out of circuit completely and then all my software loads fine. The peculiar thing is that some software will load and run perfectly with the RX80 in circuit and powered up. Can you offer any advice as to the possible cause of the problem and how I can keep my RX80 in circuit at all times? Ian Stewart. Aberdeen

Dear lan,

Dear fair. The problem and symptoms sound very similar to the sort that can be experienced when fastload and backup cartridges are in place. There are some connections between the user port and the expansion slot of the computer, both coding the computer, both coding the computer, both coding the computer of the comp

do what you are doing at present, I cah't really offer any more advice as to and report back next month if I find

Dear CDU.

I have just three questions to ask you. Firstly, is it true about a laptop 64 and if so how much would it cost? Secondly, is the machine code equivalent of the BASIC load command just as simple and effective. What I mean is, would the program automatically run if given a start address in the load program. And finally, how on earth do I put character sets designed on a character editor such as the "Ultimate Font Editor" into my working machine code programs? Stuart Smith, Manchester

as I presume you did, in the FSSL catalogue. I have no idea of the sort emerge at some future date. The tive as the BASIC one and in fact I ence Guide. But on this issue's disk source file, "PROB2", just in case you do not own a book outlining the method to use. It may seem a little more complicated than it really is at your programs you load it back (with value into location 53272. This can be found using a number of methods, but for character set number one

Your character set will make itself

Dear CDU.

I have been wanting a program that would enable me to print pictures drawn using CDU Paint to my MPS801. I carefully followed the instructions in CDU Paint and in the program "Colour Picture Printing" and the enclosed printout is the result. I need hardly say that it isn't what I wanted! However, on checking to find out where I went wrong, I found what seems to be an inconsistency in the "Colour Printing" program. In the magazine the instruction is to type SYS34840 but the screen prompt says type SYS35840 and this does activate the printer. But, try as I might, I cannot seem to get the program to print out what is on file. It loads, comes up on the screen, but will not print. Can you please tell me where I am going wrong?

Rev. W. Farquhar, Dunfermline

Dear Rev. Farguhar

I am glad you were able to sort out However, you have confused the gram in guestion is concerned with that the control codes that are sent to a colour printer will do something. whereas sent to an MPS801 they won't What I suspect you want is actually a program that prints colour pictures in shades of grey. You could "Power Cartridge" from BDL of 89 Bewick Road, Gateshead, Tyne and Wear costs only seventeen pounds ing your creation and then pressing a button followed by selecting an option from a menu. As I said, the prothat I have been able to clarify the

Dear CDU.

I have a Commodore 128D to which I would like to link a Commodore 8050 double disk drive. I have an Interpod together with all the necessary leads, but I have not got an inkling of the protocol needed to address the 8050, could you help? Perhaps one of your many readers has a spare manual that is no longer needed that he or she would be willing to sell me. Well it's a thought anyway. Do you know of a program that will enable me to drive a Star LC10C printer from the user port on the 128D? I would be more than grateful for any information that you can give me on this as it does seem a shame to have this piece of equipment lying idle. Bert Richardson, Middlesex

Dear Bert.

and price that you would want to part though I must confess I am not sure (slap wrist!!!). If anybody out there

Dear CDU.

I am having a problem with the BASE-ED program featured on one of the Commodore Disk User disks. I am using high quality disks and so it is not those that are at fault. My friend also experienced the same sort of problem when using the program. If you can help in any way to alleviate the problem I would be most grateful. I shall run through exactly what happens when I use the program. Once the disk has been formatted and the blocks allocated and the fields set up, everything is all right. However, when I try to add a record with number 452 and type the information into the field, s when it comes to saving the information I get an error number 66, illegal track or sector. Pressing RETURN takes you back to the Record Manipulation menu and from there using 'read record' I can call up record 452. However, this must be done as part of a range of records as the 'read one only' option does not seem to function correctly either. The information appears but after exiting the program and reloading the file, when I read in record 452, each field is marked as empty, indicating that the information has not been saved. Please could you point me in the right direction.

H. Coughlan, Cumbernauld.

Dear Mr. Coughlan.

of BASE-ED2. Before telling you how to cure the problem, for which you will need an external reset switch as another plea to programmers. It is simply not possible to test all programs to destruction here and so cure the fault - perhaps CDU will until you have RUN the program and disable the STOP key which doesn't change the line number after the THEN command to 2590. Next LIST F3=25 to read F3=19. That will rectify the fault with the sector numbers. You will also find that with entering

10 DN = PEEK (186): POKE53280, 0: POKE53281,0: POKE646, 15: RL=254; 30 DIM IS(500), CS(30)FBS(30),

Then type RUN. The program will you will be greeted with the main just save it normally is because there is some machine code. However, this

Dear CDU.

I would be very grateful if you could put the following humble plea in your letters column: HEEELLLPPP!!! Has anyone out there got a copy of "Laser BASIC" for the 64 for sale as I cannot find it anywhere. I am willing to pay any price (almost!). Thank you, Simon Searle, Derbyshire

it to you at a fair price. Of course, it must be the original and not a pirate copy! So if any of you are able to help. with Simon

Dear CDU,

I have recently had some excellent service which I feel worthy of note to you and your readers. On the first of February this year I ordered a 1541 disk drive and a Star LC10C printer from a company called COMPOST. They duly arrived the next Monday, the fifth. Unfortunately after testing the printer that evening I found it to be faulty. I contacted COMPOST the next morning - "No problem, Sir. We will exchange it for you." And sure enough, within two hours there was a van outside my house to collect it. Two days later, the eighth,

the same van pulled up at my home with a new printer that works perfectly. So COMPOST, take a bow, you surely deserve one for that really first class service. I for one will be only too pleased to do more business with you in the future! R. J. Ayers, Mansfield

Dear Mr. Avers

COMPOST take a bow. My local computer shop should follow their can contact COMPOST at Unit 6. Forest Close, Ebblake Industrial Estate, Ver-

Tip of the Month

Noddy's Revenge

We ask the question, is this the result of too much computer

As told by PC Plod

aving read a report regarding the controversial subject of restricting the purchase of "violent" games (such as Rambo, Operation Wolf, and even the mainly text adventure Jack the Ripper) by issuing age certificates or even in some cases, banning the game completely. I decided to sit down and put pen to paper - or at least fingers to keyboard. In case you are unfamiliar with the subject, the argument is do you play these games to simply marvel at the excellent animation and or do you play them to see the look of terror on a man's face as you fire a bullet or two into his skull? In the following story I am not conveying this is neither the time nor the best place. Instead I shall leave it up to you ten a pointless story to partially emulate the gore of Stephen King or whether I have "fictionalised", if such a word exists!, the effects that one of these so-called "hack-'em-up" computer games could have upon somebody's mind. So it may be extreme, but is it possible with some people today? I don't know - the next cry will be that my mind has been warped by playing too many hack-'em-ups. Still, enough said already, so if you are eighteen years of age or over please read on and let Noddy's Revenge, the tale of the Camberwick Green Massacre, begin!.

Everything was quiet on Camberwick Green, except, that is, for the whispering of the few trees as the wind rustled their leaves. In a small house just a few yards from the Post Office, there came a stuttered banging noise. It was emanating from Noddy's house and was so profound that all his little yellow model cars on the lounge shelf were rattling up and down. In the background one could hear the title tune from the computer game Rambo 47. Noddy had only recently purchased the Commodore 64 from a local shop and enjoyed playing these games because they were so fast and addictive. The light came through a small window, the evening sun reflecting off the monitor screen. Noddy raised the axe once more and brought it down on the now rather tattered remains of Andy Pandy. "Why.. won't... the... stupid. thing... fit..." puffed Noddy to himself as the axe came down once more.

There was a small pile of earth and a hole next to it which Noddy had hidden with the 64's dust cover. Andy Pandy, gullible nurd that he was, didn't quite fit in the hole that of making it wider, which would have called for extra time and effort, Noddy had decided to hack Andy Pandy's legs off. "A much more sensible idea," thought Noddy, as he hummed a little song to himself, cutting through the last tendon in the process. He then rammed what was left of the body into the hole, concealing it again with the dust cover. The rest was thrown uncaringly onto the open fire that warmed the otherwise cold house of Noddy. "Always so gullible". thought Noddy, "always letting that stupid woman boss him about and make him search for Looby Loo in that cutesy high-pitched voicel'

You see, Noddy had waited all afternoon for Andy Pandy to come round. Noddy was gazing blankly into the open fire humming a little tuneless song to himself whist form diling the oaken handle of the axe. After a while, though, Noddy thought that Andy would never appear and so the put the axe back into the cup-board. However, when Andy Pandy had finally turned up, knocking on

Noddy's door as if he were held up by strings, Noddy had answered the door quite normally, talked about the wonderful Camberwick weather, and then had gone to the cupboard and fetched the axe. Whilst Andy Pandy had sat there, saying nothing but with a painted expression on his face (which Noddy only served to increase) Noddy had raised the axe high and brought it down with a resounding thud on Andy Pandy's skull, cleaving it virtually in two, with just some muscle fibre in place to keep the pieces upright, and freezing Andy's eves wide in horror that Noddy could little as he remembered that delightful sequence from one of his new an action replay of what had just happened. He had actually done it in reality now and was so proud, wiping some saliva from his mouth. Noddy had then mopped up the blood, washed the axe in case it were to require further use, and then as if nothing had happened, Noddy had begun to dig the hole

begin to dig the noise.

Big Eas wontet the town with the signal begins of the signal begins

Big Ears had no time to realise what had happened, for the moment that he had opened Noddy's door and stepped inside, Noddy had slammed it shut and then proceeded with the drill, Piercing Big Ears' skull

and sending a beautiful fountain of blood all over Noddy's face and jester's hat. "How wonderfull" he cried, as he jumped up and down with excitement— this never happens on any of my stupid computer games! Noddy then pulled Big Ears further inside and put him in the cupboard with the axe that had killed Andy Pandy.

Re-installing the computer. Noddy loaded up Operation Wolf. He had never bothered to read the instructions of any of these games. What's the point, anyway? Noddy enjoyed playing this particular game more than anything else because you actually looked face to face at who you were killing, which Noddy thought was a wonderful touch of realism. After half an hour, Noddy finally got blasted himself. Still, he experienced a euphoric feeling of power that made him even more irritable. Andy Pandy and Big Ears had definitely deserved everything that they got. When night had duly fallen. Noddy dragged the bodies outside and buried them in a make-shift grave by the side of his house. "Auf Wiedersehen 'friends'," Noddy giggled, "things are going to change round this town now that I am in charge." He laughed hysterically and went back indoors.

Morning came and Teddy and house to see whether he knew where Andy Pandy and Big Ears were because nobody had caught sight nor sound of them since yesterday afternoon. Wasn't that a surprise? When they reached Noddy's house the door was wide open and Noddy was nowhere to be seen. Teddy and Looby Loo looked inside the house and noticed a hole in Noddy's floor. The monitor was still on and a notice was stuck to the wall with a blob of congealing jam that Paddington had given to him about six months ago. It read, "out getting the hefflump" "That's strange," thought Teddy, "there are no heffalumps around Camberwick Green, only flowerpot men. What is Noddy up to now?"

Not even the partially warped mind of Teddy could have imagined what Noddy was up to. That morning he had woken up with a splitting headache after having a dream about what he had done to Andy Pandy. To take his mind off the headache he decided to sit down at his computer and have another blast at Rambo 47. container with the word INSECTICIDE written on the side and DANGER below it in large red letters. He took the container into the middle of a field, in fact to Muffin the Mule's favourite patch of long grass. "This will serve that poor excuse for a horse right," laughed Noddy loudly as he sprayed it over the grass, "Always claiming that he could beat me at my computer games." Noddy then hid behind a decidedly large tree and waited for Muffin the Mule to approach. About twenty minutes later he came trotting over the hill and Noddy watched the unsuspecting Muffin eat himself to death - sheer poetic justice after he had spent five hours playing an adventure, only to die of food poisoning from a sandwich that was found in a cupboard. Noddy dumped the nearly dead body of Muffin the Mule in the same grave as Andy Pandy and Big Ears, Muffin the Mule's eyes seemed to be staring in disbelief - "You are very lucky I didn't chop you into little bits and then feed you to Teddy!". Noddy continued to laugh manically before once again concealing the make-shift grave with the 64's dust cover. Talk about dual purpose goods!

Noddy didn't return to his house until dinner time and by that time he was missing his computer very much. So when he returned to his house he was in quite a bad mood and all he needed to make him absolutely mad was the sight of Teddy and Looby Loo jumping up and down outside his house singing "Bouncy, bouncy. Bouncy, bouncy". Looby Loo was holding a large parcel with "Do not bend - contains computer software' wouldn't have made any difference to Postman Pat. He usually bends things just to be spiteful - the old fuddy duddy - and as for his cat!!! Inside the parcel was a load of software that a friend of Noddy's in Trumpton had copied illegally for him. "Ha! Hal", thought Noddy, "all those authors that are getting ripped off because of piracy." This lightened Noddy's mood somewhat.

Noddy then felt extremely lucky when Looby Loo said that she had to go home to play with her building blocks, because that left Teddy at his mercy. Noddy smiled slyly as an idea

began to form in his over-active brain when Teddy suggested they go and play that game that Pooh Bear had showed them how to play – which they called Pooh sticks. "What a great opportunity", whispered Noddy to himself as he followed the innocent Teddy to the bridge over the River Turn.

Once they were on the bridge and he rather pointless and infuriatingly boring game of Pooh Sticks was underway. Noddy thought how he would much rather shove his stick somewhere that Teddy would find rather painful instead of throwing it mindlessly into the fast flowing stream beneath them. Teddy was learning institied and so did not see Noddy's wide. Poorfile grin as he outstretched his arms and moved towards Teddy with the cruel intent of pushing the supid thing into the stream. "Oh what furn this willbe." thought Noddy. Just like that scene on the Last Ninja

where you push that twit off the cliff!" hit the water and started to struggle water. He was gulping and choking. Noddy was holding on to the rail of the bridge and jumping up and down with fulfilment, joyously shouting at the drowning Teddy. "Why?", spluttered Teddy sadly as he slowly started to turn blue with the cold of the water that was engulfing him. Noddy found this somewhat hilarious. "I'll tell you why you stupid imbecile!", "It serves you right for making jokes about my red mudguards!". Teddy was unable to hear this answer as he had already floated quite a long way downstream. He was face down - dead. "Good riddance" laughed Noddy as he looked at his watch. "And there is still time to get that pest Looby Loo. She now!" The sound of the bell on Noddy's hat became less audible as he strolled off into the distance.

Noddy sneaked through the garden gate and past the sleeping figure of Weed. Looby Loo was asleep on top of her large building blocks. You could hear the cogs clicking around in Noddy's head ashe thought of the best plan. He remembered the film "The Day of the Triffids" and although's tidnit arouse as much satisfaction in him as it would have done had he been able to duplicate a had he been able to duplicate a computer adaptation, he carefully picked up Looby Loo and took her outside. It was there that he laid her was another option - perhaps he could blast her head off with a submachine-gun like in Robocop. After all, emulating what happens in a computer game is much more enjoyable because with a game you come so close - you actually kill the people

Still, he settled for his original idea and carefully, with Looby Loo in one arm, lifted up Weed by her stem. He laid Looby Loo at the bottom of the flowerpot and then replaced Weed. Almost immediately he heard the muffled screaming of Looby Loo as she was gradually suffocated by the weight of the mud on top of her. Weed slept through it all, good job as well - for if she hadn't, Noddy would that she wouldn't grow again next smiling at the thought of Looby Loo finally having her mouth filled up permanently.

The computer was still on and

Noddy sat down to play a final game of Rambo 47 before he tried out his new software that had been sent to him. Five...ten...twenty...thirty...forty minutes passed before he finally gave up. He was getting annoyed because killing people on the computer was becoming boring. He had been able to go one step further and actually kill the people in reality in almost the same way that he would have on one of how he would one day get round his head as he stuck a knife into the stomach of one of Rambo's enemies a couple of minutes ago. "No, that postman," he said aloud as he unplugged his '64. There was a knock on the front door - "Post for you, when he heard that come through chain saw.

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story then maybe you should have a serious think, and then perhaps laws of censorship and age restrictions on computer games should be more rigidly enforced. But hang on a minute those creatures were being cruelly killed or were you amused by the right. I have exaggerated the storvline show that this type of story can have any sort of basis. It is totally unoriginal. mindless and senseless acts as those in nous after a while - but you must already read on to find out what happens next. Does it sound a bit like what play those shoot-'em-ups? I think it does. There are also the role playing games - like Dungeons and Dragons - that some people think are the basis of witchcraft and devil worship. Where I shall leave you to decide.

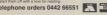
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'C' Here

we start a series looking at the possibility of programming in 'C' as the alternative language By John Simpson

f you want to look out to C, you will find it really is worth your while. It is a fact that it is people who program computers to bidding invariably start off by graphing the intricacies of 84SLC, and then, if they are really keen to construct fast action, smooth running, and totally controlled programs they may move on to ASSEMBLES.

BASIC is, as it says - basic (although this is not what BASIC means! It is an acronym for Beginner's Allpurpose Symbolic Instruction Code). However, it is reasonably easy to use and is not too difficult to learn. For the Commodore 64's version of BASIC there are 70 or so 'keywords' which need to be committed to memory, and then quite a lot of juggling with the commands needs to be accomplished to achieve reasonable results - as an example the IF: THEN: ELSE statements. 'Else' in the BASIC which is delivered with the C64 doesn't exist, however, with some juggling, which regrettably, uses up more memory and does slow down execution time somewhat, can be simu-

One answer, of course, is to purchase a "BASIC Extension" type of program... several of which have been published in Argus Publications from time to time. However, this does mean extending your 'keyword vocabulary, and sometimes by as much as a couple of hundred or more keywords'. Phew! ASSEMBLER, on the other hand, is much easier to learn — there being only fifty-six memonics or codewords in the instruction set of the C64. Using it, on the other hand, can be somewhat more difficult and a thorough the control of t

The reason for this is that BASIC is. as you probably know, an interpreted language. What happens in the murky depths of computer memory when you run your BASIC program is that every single byte on every program line is shunted off to a massive interpreter program where it is transformed into binary machine-code (and not always the most efficient MC at that!) and then executed, after which it returns back to the BASIC program to 'grab' the next 'chunk' of instructions to be interpreted. Oh so slow, Sprites are only able to amble across the screen rather like jerks at a jelly party, from one place to another tend to dribble along like a stream in a drought.

In ASSEMBLER, on the other hand, the same sprites can easily traverse the screen so fast the eye perceives only a flash, and block data transfer is seemingly instantaneous. Split screens, multiple-sprites, and full multi-track musical scores all being possible within a single program. Witness today's modern qames!

Of course you can get hold of a BASIC compiler. The difference between a compiler and an interpreter is the latter interprets the BASIC into machine-code whilst the program is actually running, and the former will compile each BASIC line of code into machine-code and finish up with a separate machine-code program which runs independent to the original BASIC program. The compiler will take the BASIC program, and, after a great deal of time for a rather complicated and large program, translate it so you finish up with a rather clumsy machine-code program which is faster than the original BASIC, but only a

So where is the middle ground? What is the language which lies somewhere between the ease and readability of high level BASIC and the speed and control of low level ASSEM-BLER? The answer lies out to C.

Before I dive into the C language there is just one more point. Portability. The writing of a program on one machine and the running of it on a completely different one.

Commodore 44 Sandard; can, but only with a great deal of fass in bother – the rewriting of chursks of the program, changing keywords, ossibly screen codes and memory addresses – be transported to another machine. Atask most programmers have no with to dol ASSEM BLR. on the other hand? Mery simply screen the commodities of the commodit

C - how did it get such a simple name? Well if you are that interested the early ancestor of C was a language developed at the Cambridge and London universities sometime around the early 1960s and which was eventually transformed into BCPL. a systems programming language which incorporated control structures needed for structured programming. Later a chap called Ken Thompson. working at the Bell Laboratories, derived a sub-language from this into what became known as B. Then along came Dennis Ritchie who, in 1972, invented C, a name chosen to indicate a follow on to B. The aim of C at that time was to write operating systems to work with the UNIX system which was still under development at that time.

So, a big thank you Dennis. What are the advantages of C? I suppose they can be summed up as Structure, Portability and Compact-

Structure, in BASIC, although not completely impossible is often not put into practice, usually because the learning of BASIC is often by experiment/accident trial and error and quite usually with GOTO commands splattered every which way.

Naturally a program is only as good as its final function. In other words, does it accomplish that for which it was originally intended... and if it does, and if the program will never need revising, or updating, or another programmer taking over... then fine – but should it need one or

the other of the above then the unstructured program can take tedious and frustrating gulps of a programmer's very valuable programming time just to sort things out and to discover just what section of code is intended to do just what.

A well structured program is usually truly modular in its form. This means that one module can be completely independent to other modules, and even to the main processing program. This is one of the major differences from BASIC to almost any other programming language. It is not possible to have a completely structured BASIC program simply because BASIC subroutines are not truly modular. As an example of this if we were to construct a subroutine with an integer variable, which we shall call DUMMY, within it, then altering the value of DUMMY anywhere else in the program will alter DUMMY in the subroutine (and elsewhere for that matterl. This is known as a Global variable. Fine, but as a grammer must take great care when specifying variable names in subroutime spent in the passing of values

In C the equivalent of a subroutine is known as a FUNCTION, and all of the variables in a function are completely local to that function. In other words if you assign a value to DUMMY within a function then it only exists within that particular function. Shouldyou have another function, or even the main program, with a differtent DUMMY variable within it, the will not have the same value, not any effect upon the first, or vice versa.

It is only by using deliberate programming that you are able to pass a value to a function or back again. This makes it an easier task to desire this makes lit an easier task to desire this modules separately and without the worry of variable names which way have been used in other modules or the main program. Thus rended and each module as a complete 'standalone' module and with total control over all of the input and output operations.

erations.

A really great feature of C is its portability, in other words a program written on one machine can, with recompiling on a different machine, be just as easily run on that different machine. There are a few conditions imposed but they are usually rea-

sonably obvious. The compiler must allow for the normal C statements. Some of the smaller machine compilers may not include fractions, or floating point numbers. If a program includes screen effects, such as graphics, then it will need library functions (more of these a little later). Basically, then, it is the compatibility of compilers rather than machines that count for portability.

As far as compactness is concerned it is possible to write a program in C and then by making adjustments, and shortening it quite considerably. It can be written in such a way that gives faster running code, faster compiling time and is so much chosters and easier to parts.

Some quite astrounding difference is the unusually small amount of reserved words within the language. As you probably know and as I mentioned somewhere earlier, the development of B&Sci. In recent years has objected to the property of the comaciding possibly 150/200 or more extracersord keywords. All of which need added routines, system variables and vectors to execute them and in so doing using up very valudate PAM memory block. In reality of has been designed in such a way as to make it very powerful indeed.

All the actions you are most likely to need are contained in a functions library compiled and ready for your use. The functions library will contain all the routines you are likely to require. Such things as screen formatting, printer options, open and close files, and etc. A comprehensive Tibrary' will be included within the C package which you purchase. For example. "Spinnaker's" POWER C plus library functions: these range from converting strings pointed to by argument into either integer or float quantity through system calls to machine code to general purpose sort you can add new functions to your

ibbrary as and when you desire. Staying with POWER C for the Commodore 64 by "Spinnasker" lets look into more detail about just what you might expect from the C package. First, there are two disks ja] The System Disk and [b]. The Functions Library Disk. The Functions Library Disk contains a vast library of all the different functions you will need to

create your programs, but as time goes on and you become more proficient in the use of C you will findyourself adding to that library finduters are functions to control Sprites, split-screens, hand-scrolls, sounde-f

program which creates the operating environment from which the rest of the programs work. From the SHELL, you can 'call' the Editor program which comes with or without a syntax checker. It is within the Editor where you will write your program, make changes and in general edit until you ing into an object code (binary machine-code). So, back to the SHELL and a 'call' for the Compiler program. Once the program or module is the compiled object code to make it as small as possible, gaining valuable RAM, so from the SHELL a call for Trim'. Once this has run through the program you are then presented with a screen display of the results of its efforts on a percentage basis. At this stage you will want to link in library functions and/or other modules, so again, from within the SHELL, you can call up the Linker program which will take care of this task for you.

Once the linking is done the program will request a filename and save out the completed object code program to disk which, depending upon the suffix used, can then be run from either within the SHELL environment or as a stand alone program which can be run on any G64 without the

SHELL operating environment. Here follows a simple BASIC and equivalent C program to whet your appetite for the next article 'Let's Get Down To Coding in C', next issue. Doesn't look much different. does it?

BASIC
PRINT, "HELLO EVERYONE"
END .

Print("\tHello Everyone\n"

FEATURE

To sum up, then, I should like to quote the author lan | Sinclair from this excellent book "SIMPLE 'C' A Beginners guide" published by David Fulton Publishers.

C is a language which combines the power of machinecode with the structure of a high level language.

does that you normally associate with machine-code, and will generate compiled code that is almost as compact as machine-code from an assembler. At the same time, though, C provides all the structures of a good high level language, like facilities for creating loops, many different variable

types, structured variables like arrays, and so on Next issue I shall begin with getting down to the nitty gritty of actually writing programs in C. The package I shall be using for this will be the highly recommended "Spinnakker's POWER C" for the Commodore 64/128

SOME RECOMMENDED READING:

The C Programming Language: Kerningham & Ritchie

The C Programming Tutor: Wortman & Sidebottman

The C Programmers Handbook: Thom Hogan (Prentice-Simple 'C' A Beginner's Guide: Ian Sinclair (David Fulton)

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Power Cartridge Competition Results

he recent 'Power Cartridge competition proved to be very successful with all our readers. As always, there has to be losers as well as winners. If your name is not one of the lucky ones we are very

List Of Prize Winners

G.McNaughton

F.Burgess

C Woodhouse

M. Mitchell

D.Washer

J. AWayman

J.W.Borland

C.Henoca

A.Mitchell

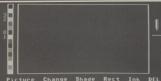
possible. Once again I would like to thank you all for taking the time and



G.A.C. + under review

MAIN HENU





Picture Change Shade Rect Int DE Harlor Hhole Fill Dot AD CRSR Leys - Move Cursor PIC ... Keys - Step Fwv.Ds LASI Hhich picture number ?...

Tony Rome investigates the updated G.A.C. system and gives us this report

o the would be adventurer, both beginner and expert, the very thought of setting off on a dangerous mission, risking all for the world's largest diamond, the conquest of space or the hand of a princess, is both compelling and addictive!...

Personally, having used this programme. Ifound it easy to follow. The instructions are explicit and uncomplicated and the final results can be quite effective. Incentive Software state as follows. The picture editor is packed with various features allowing you to easily create stunning you to easily create stunning found to be true, depending upon your ability as an artist. GAC as new years now but technically still holds its own now but technically still holds its own as an adventure writing package. The main features include automatic word formatting, an intelligent command interpreter, abbreviated input acceptance, synonym recognition, space for 765 nouns, verbs and adverbs, multiple command lines, recognition up to full length of word, if detection, extensive text compression etc and a 'save and load position from a game' facility etc.

The FILLS incorporated in the new GA.C Plus is an addition to the old programme giving it virtually unlimited scope and enabling the unlimited scope and enabling the inhead adventures. This in effect means and adventures. This in effect means and enable to freely move from an original adventure into other adventures and back without users adventures and back without which is drawn This allows you a more comprehensive vocabulary which is essential to the well constructed storyline.

Everything in G.A.C.+ is clearly mapped out in the instruction manual and can be easily comprehended.

Returning to the 'Graphic' side of G.A.C.+. Graphics like these are made simpler using the various' tools' of the picture editor: i.e. (Shading, Rectangle, Ellipse, Dot and many other features all constructed on a hi-resolution screen.

If you bought the December issue of C.D.U. you will know that 'KRON' was achieved using the Graphic Adventure Creator. This is an illustration of G.A.C.'s ability.

For those of you that already have G.A.C. you may be pleased to hear of a software package written by Don Macleod. This programme will give you a comprehensive printout of Room Descriptions, messages, Nouns, Verbs, Adverbs, Objects and Conditions. It also has the facility to delete unwanted letters and words that you have erased but remain in the programmel This is an invaluable addition saving your hours of searching through screen listings trying to find out why the 'Gorilla ate the latter instead of a banana', or why you can't open the vault!

This programme which is called the G.A.C. Database Printer is available from Blo SKY SOFTWARE — more details later. So... if you think you can write a marketable adventure then all in all G.A.C.+ is well worth its fairly modest price.

By the way, if you enjoyed 'KRON' then look out for THE CRAMORE DIAMOND CAPER, coming soon in CDU and using the G.A.C. Database Printer – Price E5 available from:

BIG SKY SOFTWARE 35 Old Evanton Road DINGWALL Rosshire IV15 9RB SCOTLAND

G.A.C.+ Available from: Incentive Software Ltd Exclusive Distributor Mandy Rodrigues 67 Lloyd St. LLANDUDNO Gwynedd LL20 2YP *

G.A.C.+£29.95 or send £10 together with your old G.A.C. PROGRAMME (Disk or Cassette) for the updated PLUS version.

Continued from page 19

Animating the sprite

To animate the sprite you must store the various frames of animation in consecutive memory locations. Then press A. A prompt in the drawing area will ask for the starting pointer, enter the pointer for the first frame of animation in hex, then a prompt will ask for the final pointer, enter the pointer for the last frame again in hex. The animation will then be displayed in the top right hand sprites and also in the current library sprite. The current pointer that is being animated is shown in the drawing area during animation. The animator will exit to the main program when the sequence is finished or if any key is pressed during animation.

Input/output

Pressing '@' will display the Disk Menu. The Disk Menu allows all saving, loading, directorying etc. It consists of the following options:

1. Load.
2. Save.
3. Verify.
4. Directory.
5. Disk Status.
6. DOS Command.

1: This allows the loading of data. A prompt will ask for the device [1/8] where 1 is tape and 8 is disk. Then it will ask for a flierance in one flexame is necessary on tapel, Another prompt recessary on tapel, Another prompt to find out if you were the program to find out if you were the program to find out if you were the program obaded at the area it was saved or whether you want it loaded into a new location. If N is entered you will be asked for the new address. Others it will be loaded into the activate it will be loaded into the activate it will be loaded into the asked from Finally you will be asked you will be asked from Finally you

2: This allows the saving of data. It will then ask for the device and filename as above. You will then be prompted for the start and end addresses of the save. Finally you will be asked to confirm the information as above.

g @0:Filename will o ting named file.	overwrite

This allows you to verify data that has been saved. This will ask for the device and filename and then it will verify.

4: This displays the disk directory.

5: This displays the disk status. ie. if there is a disk error.

 This allows you to enter DOS commands some of which are listed below. The full range of DOS commands and errors are listed in the disk drive manual.

COMMAND	TYP
Directory Disk Status New (Forma Rename Scratch Initialise Validate	t] N:Diskname,I R:Newname=Oldnam S:Filenam
7: This exits	to the main program.

Helpscreen

Helpscreens are available by pressing H. Press any key to view the second screen and then to exit.

Key summa

The keys come in order from the top left of the keyboard

3 4	Library Sprite 3
	Library Sprite 4
5	Library Sprite 5
0	Change Sprint Bank
+	Increment Pointer
	Decrement Pointer
CLR/HOME	
& SHIFT	Clear Current Sprite and
	Drawing Area
INST/DEL	Change Text Colour

Wipe Current Sprint
Sprite
Exclusive-OR Sprite
[mono Only]
Scroll Right
Trade current sprite with
current sprint sprite
Y mirror
Scroll LIP

Disk menu Animate Store current sprite at current sprint position Scroll DOWN Grab current sprint sprite and place it in the drawing area and also in the current library

sprite
Scroll LEFT
Increment sprint color
Multicolour/mono
chrome sprint toggle
Plot current colour at
cursor position
X Mirror

X Expansion of current library sprite and sprite in top right corner of screen Y Expansion of current

In top right corner of screen Increment border colour Selector for current col our in multicolour mode

Selector for current co our in multicolour mode Multicolour/mono chrome sprite toggle increment multicolour I Increment multicolour I

Move cursor UP
Move cursor DOWN
Move cursor LEFT
Move cursor RIGHT
Delete at current curso
position

OYSTICK IN
PORT 2 Same as cut
FIRE
SHITTON Same as cets

ON Same as return or space depending on drawin mode Select draw Select delete Increment backgroun colour

Disk

Dungeons

Gordon Hamlett looks at what's new on the scene for adventurers

minis is still a very quiet period with only one new game to report on which, unfortunately, I didn't enjoy very much but you can have everything. It will be interesting to see whether this Iull is only term porary or whether all current role playing game (RPFG) work is being done largely for the sixteen bit market with eight bit conversions only as an after chouch.

The only new games that are being heavily advertised at the moment are the latest Dungeons and Dragons games from SSI. These games are based on the hugely popular Dragonlance series of books and will feature a war game and arcade games as well as RPGs. The most successful RPGs are still fantasy based and I started musing on the reasons for this. Certainly, there is scope for a good game that doesn't involve trolls and treasure but no-one seems to be writing it at the moment! There has been a mini spate of science fiction stories recently but these just don't seem to work as well. Combat with lasers, ray guns and photon torpeslings. A message informing you that your ship's shields are down to 13% efficiency seems so much more impersonal than knowing that your favourite wizard only has three hit points left! Another factor is that sci-fi combat tends to offer less scope for tactics than the traditional hand to hand stuff. There's not a lot you can do with 'Zap- You're dead! With the whole field of magic missing as well, two of the main pillars of the fantasy RPG have been removed at one fell

What do you think? Am I talking through the end of my body not normally associated with speech as usual or do you still prefer fantasy games? If not, what sort of stories wouldyou like to see instead? Pirates, Westerns, Yuppies or what. Write in and tell me what you really want to play. You never know, there might be a company out there somewhere who is looking for a decent original blot.

Enough of the waffle for this month, and on to the review. Sentinel Worlds 1 – Future Magic from Elec-

SENTINEL WORLDS 1

You have been commissioned by the Federation to investigate a series of raids on Cargoliners which were ferrying supplies from the Caldorre System to outlying frontiers. The intelligence available to you is minimal if not to say non-existent as you and your crew of five set off on a mission from which you are not expected to

There is a crew already picked for you if you want to start play straight away or you can start from scratch and train the crew just the way you want them. The five members are pilot, navigator, communications of-ficer, engineer and medic. Each crew member has five basic characteristics – strength, stamina, dexterity, comprehension and charisma and you assign between 10 and 20 points to creat well of 20 points to creat well of 20 points to creat well of 20 points of them a central well of 20 points.

In addition, each crew member has a series of additional skills; in weapons (contact, edged, projectile and blasters), tactics, reconnaisance, gunnery, repair of the all terrain vehicle, mining, athletic prowess, observation and bribery. It is up to you to get the blanne of skills correct for your party as no one person can do everything. Ay you become more do everything, Ay you become more so you can enhance existing skills or learn new ones.

Once in space, you are quickly attacked and your convoy broken up.





From now on, you're on your own, You can either stay in space attacking the pirate ships and discovering what you can from boarding them or explore the different planets and space stations with the intention of glean ing extra intelligence there. The main problem with this game lies in the space travel which is very much a hit

or miss affair, certainly in the early stages. The scanner display is almost impossible to read — tiny little dost which may or may not be different colours, (it is difficult to tell with the flickering) and finding your way around is fairly random. Why you couldn't be provided with even the co-ordinates of all friendly bases let alone a sophisticated system such as locking onto a beacon, is beyond me. And it really does spoil the game.

Similarly, moving your spaceship around is a fairly crude affair and enemy craft whizz past you as you try to manoeuvre. For anyone who likes to take their time and ponder each move, this 'real-time' action will be another aspect of the game that won't appeal to them.

appear to them.

appear to them.

gime very difficult to get into and
soon lost all enthusiant for it. This is
a pily as a cursory look at the packaging shows that there is a lot of substance here for those who persevere
spaceships to explore. I can't help
feeling that it would have been a lot
better to start the adventure off on
land and give the player a chance to
explore and get a feel for the game
of the player and the player of the player
gives and get a feel for the game
deeps space.

Alot of these criticism are teld in with what I feel about science fiction role playing games in general (see above). At the moment, they just don't grab me when I desperately want to be grabbed. There is too much space be grabbed. There is too much space boring and time consuming. Can't we have a futuristic game that its just set on one planet? I seem to remember that Wasteland managed to do that and it is surely no coincidence that that is still the best Sciff game to

Finally this month, a damsel in distress, namely Mrs J. Hatchett from Brighton who is having trouble at the start of Ultima V in so much as she keeps getting beaten up by the Shadowlords when she wists a town and doesn't have sufficient funds to buy herself any decent equipment.

The Shadowlords are designed to be a major menace and the obvious suggestion is to explore the places where they aren't first So, concern trate your early explorations around Lord British' castle, the town of Britain and the Britanys, villages, lighthouses and Castles. That should keep you quiet for a bit.

As far as money and supplies go, walk backwards across bridges until you get attacked by trolls. Defeating them normally provides a good haul of treasure which you can sell or use as you see fit.



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